March 2, 1936

STEEL

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FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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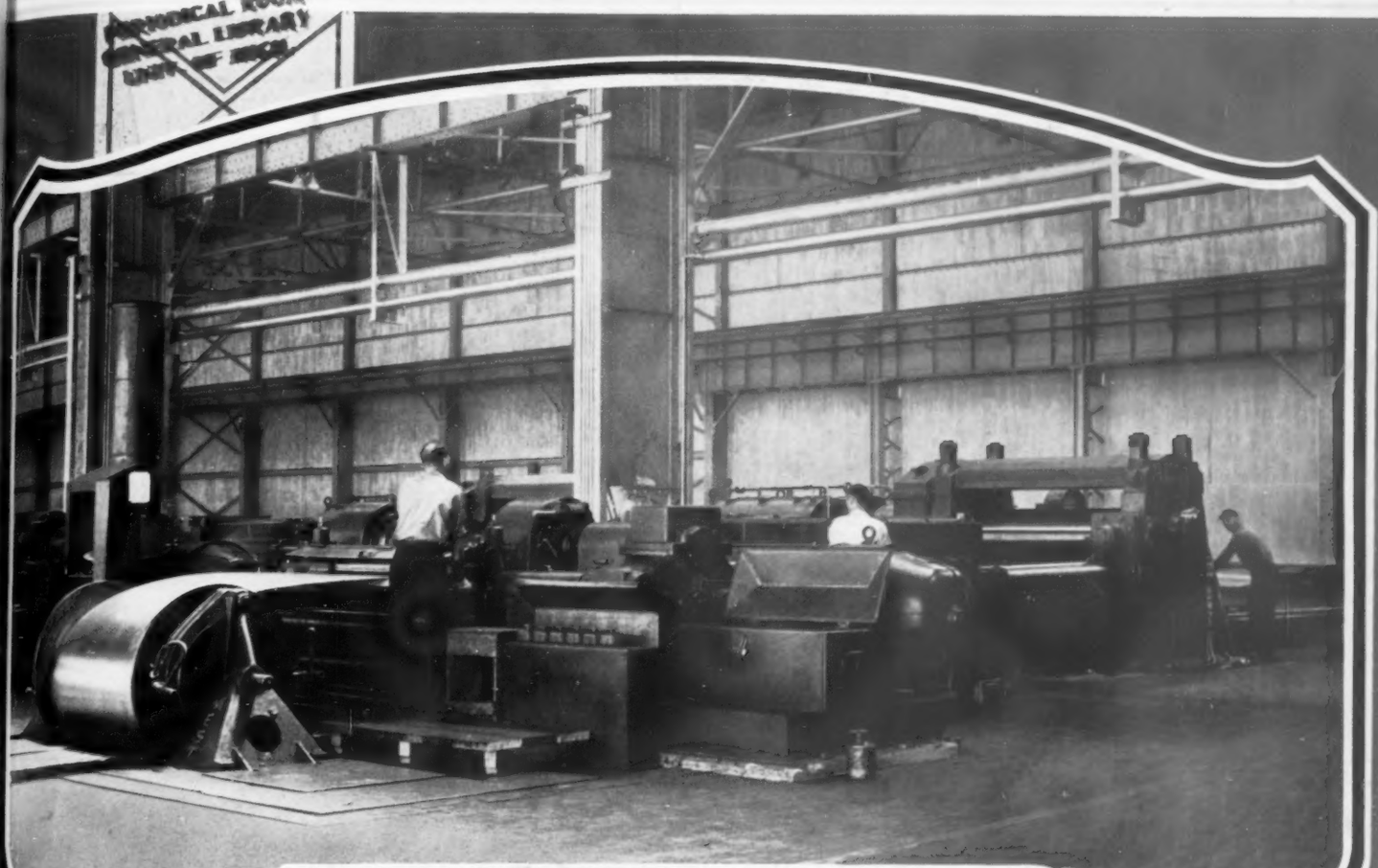

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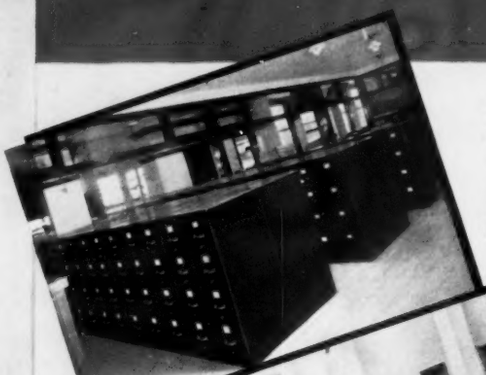

Left: Mueller Fire Insurance Company office at Chicago, Illinois

Below: State Board of Probation, Boston, Mass.

Above: New Berloy "Moderno" Letter File

Right: Berloy Equipment in the Department of Public Works, Milwaukee, Wisconsin

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For forty-eight years—IRON TRADE REVIEW

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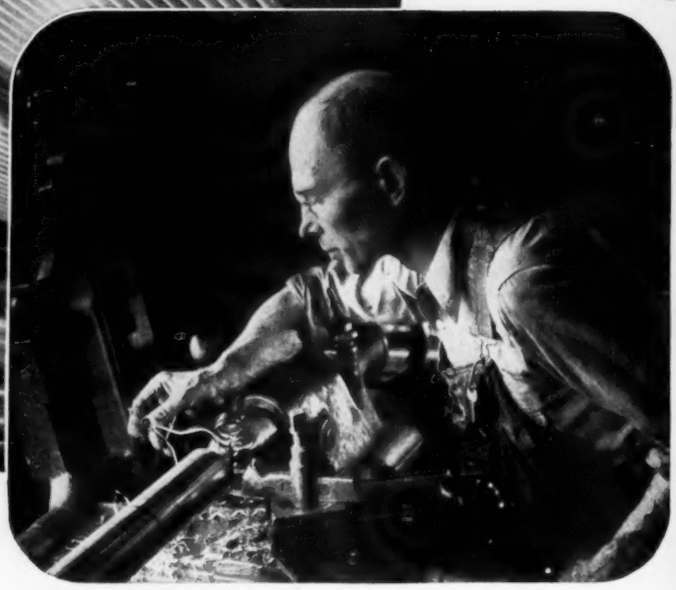

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RYERSON STEEL SERVICE

As the Editor Views the News

AFTER several years in which light flat-rolled steel products have held the center of the industrial stage, signs now are appearing which indicate that interest in the so-called heavy products—plates, shapes, bars, etc.—is being revived. Two reasons for this are apparent. First, the producers of the heavier items are assuming more aggressive policies in regard to technological development, merchandising and sales; and secondly, the capital goods industries, which normally take large tonnages of the heavy steel products, are rapidly approaching the time when they must resume the purchase of these materials on a large scale.

• • •

Railroads in Better Position

Support for this statement is found in developments in recent weeks. Thus far in 1936 structural steel awards, as reported by STEEL (p. 100), have been running about 80 per cent ahead of awards in the same period of 1935. Railroad purchases also have been heavier and will continue so. Only a few days ago J. J. Pelley, president of the Association of American Railroads, declared (p. 75) that a "gain of 25 per cent in business would put the railroads in the equipment market on a large scale." This may explain the current strong position in the stock market (p. 23) of the leading producers of heavy steel products.

• • •

New Steels Winning Favor

More significant than the evidence that the demand for heavy materials is recovering is the strong probability that the low-alloy, high yield strength steels gradually will take the place of much of the carbon steel that dominated these markets in the past. At the recent symposium on these alloys (p. 72), one speaker stated that "it will not be surprising to see the day when these steels are the regular tonnage steel and when present-day plain carbon steel will be obtainable, should anyone need it, only upon special order." To many this prediction will appear to be bold, if not fantastic, yet it is a prophecy that cannot fail to stir the imagination. We are convinced that these steels hold the key to a vast field of opportunity. They deserve a good generic term (p. 37) to designate them properly.

• • •

"Electric Eyes" Help Industry

While the function of the photoelectric cell or "electric eye" is pretty well understood, few persons are aware of the extent and diversity of its potential applications in industry. It is serving faithfully in hundreds of plants (p. 40) for controlling operations of many kinds, inspecting metal parts and assemblies, etc. However, for every existing installation there probably are dozens of situations where a photoelectric control unit could be introduced profitably. In many repetitive operations involving inspection, grading or sorting where the human senses of sight, touch or hearing are used, electron tubes will do the work more accurately and more quickly. Most manufacturers owe it to themselves to be better informed as to the qualifications of this faithful servant.

• • •

Organizers Face Tough Problems

Will the proposed attempt to organize the employes of the iron and steel industry be any more effective than past efforts? On one hand is the likelihood of a strong financial backing for the organizers (p. 22), but against this is the confusion arising from the fact that William Green would attempt it by the old methods of craft unionism while John L. Lewis would try it through a vertical organization. Another factor is the attitude of iron and steel employes. A fair rate of activity in the industry, insuring steady work and good pay checks, would make the task of the organizers more difficult. The great majority of employes are level-headed and sensible.

E. L. Shaner

Green, Lewis Plan Separate Drives To Corral Steel Labor

LABOR in the iron and steel industry became a pawn last week as two opposing factions in organized labor took advanced positions in the program for organizing the industry.

The opposing forces are the American Federation of Labor, for which William Green, its president, is the spearhead, representing orthodox craft unionism, and John L. Lewis, president of the United Mine Workers, and chairman of the committee for industrial organization, which is determined to corral labor in the mass production industries in a vertical organization for each industry.

To Spend $1,500,000

While Mr. Green last week was perfecting a budget for conducting a steel industry organization campaign, in response to the decision of the A. F. of L. at its convention in Atlantic City, N. J., last October, Mr. Lewis, claiming also to be working toward that objective, pledged his committee to raise $500,000 for organization purposes—of course, along vertical lines.

This offer of $500,000, to be raised by the eight unions backing Mr. Lewis, was made contingent upon the A. F. of L. itself raising $1,000,000. This places an estimate of $1,500,000 upon the cost of organizing the steel industry.

Responding for the A. F. of L., Mr. Green refused the offer of money and co-operation from Mr. Lewis' committee for industrial organization, on the ground the Federation itself will start its own drive.

In rejecting this offer of $500,000 Mr. Green declared: "As soon as I complete the budget I will ask every union in the federation, including those in the industrial union committee, to contribute money and organizers, with no strings attached."

Meanwhile, it is assumed that Mr. Lewis and his backers will inaugurate their own campaign, and hence the threat that iron and steel works labor may become merely a pawn in the contest to determine whether the supremacy in organized labor shall rest in craft or vertical unions.

The bridge between Messrs. Green and Lewis was not narrowed any last week when the latter again refused the request of the executive committee of the A. F. of L. to disband his committee for industrial organization.

In his communication on this subject Mr. Lewis called attention to the fact that the A. F. of L. convention last October instructed the executive council to extend the organization in the steel, automobile and other mass production industries and, says Mr. Lewis, "it is precisely to this end that our efforts are directed."

The letter from Mr. Lewis was the result of a meeting held in Washington of the committee for industrial organization, called for the special purpose of acting on the A. F. of L.'s suggestion that it disband.

Mr. Lewis said that his committee believes that "continuance of the committee is not only fully justified but essential to the future growth of the A. F. of L. * * * * We wish to emphasize again that we are trying to remove the roots of dualism by making it possible for the millions of mass production workers now outside the A. F. of L. to enter on the only basis they will accept—industrial unions."

Speaking of affiliates in the steel and automobile industry, Mr. Lewis said that "many A. F. of L. affiliates in these industries testify that our activities have been of great value to them. We are forced to the conclusion that many of those who are trying to brand us falsely as dualists are themselves none too eager to see the unions in the mass production industries grow in influence."

The $500,000 which Mr. Lewis offered Mr. Green for organizing steel workers presumably would be largely raised by the Amalgamated Clothing Workers, the International Ladies Garment Workers union, the International Typographical union, and five other groups affiliated with him. In the 1919 steel strike, the first-mentioned union contributed $100,000, and the second $50,000.

Amalgamated Not in Picture

Whatever union organization exists in the steel industry now is represented by the Amalgamated Association of Iron, Steel and Tin Workers, which over the past year has been wracked by internal dissension, largely precipitated by the more radical "rank and file" element. Michael Tighe has continued as president.

The Lewis or vertical group would not use the Amalgamated in its campaign; it has not been determined whether the A. F. of L. would rely on it in its drive.

The program of the vertical group, which is admittedly the most active

Will Labor Be Ground Between Them?

William Green, president of A. F. of L., in right foreground, is fighting for craft unions. John Lewis, mine worker president, in left foreground, is leading the vertical or industrial group

at present, is stated in the following letter sent to the A. F. of L. by Mr. Lewis:

In view of the urgent need for an organization campaign in the steel industry, and in the spirit of repeated resolutions calling for such a campaign that have been passed by American Federation of Labor conventions, we wish not only to pledge our hearty support to any effective move you may launch for that purpose but also to make a concrete proposal for immediate action.

As representatives of the eight American Federation of Labor unions that have associated themselves with the committee for industrial organization, we have given serious attention to the problem of organizing the steel industry. Since its formation, our committee has been flooded with requests for aid from the workers of this industry.

Resolutions, letters and other expressions of opinion have come to us from every steel center in the country—from lodges and officials of the Amalgamated Association of Iron, Steel and Tin Workers, from independent unions, from company unions and from countless individual workers, both organized and unorganized.

All of these communications point to the favorable sentiment now existing for organization, to growing rebellion among company unions, to the desire of independents to join the main body of labor, and to the necessity for quick action lest the present opportunity be lost to labor.

But at the same time, all those with experience in the steel industry emphasize that certain pitfalls which have been responsible for past failures must be avoided if the organization campaign now contemplated is to be successful.

Proposals Listed

We must therefore outline certain conditions which we consider necessary for success, at the same time as we make the following definite offer:

(1) We are ready to offer the services of trained organizers from our respective staffs for a properly planned campaign to organize steel.

(2) We consider that a fund of $1,500,000 should be raised to launch the campaign on the requisite scale, and of this amount we pledge ourselves to raise the sum of $500,000 from our eight unions.

Following are some of the main conditions which we consider necessary to the launching of a campaign that will really produce results:

(1) Organization must be along industrial lines. Past experience has shown that large numbers of steel workers can be brought into one organization by united and well-timed effort, but that organization breaks up and disappears when the workers are threatened with division into a multitude of craft unions. We therefore require assurance that all steel workers organized will be granted the permanent right to remain united in one industrial union.

(2) The leadership of the campaign must be such as to inspire confidence of success. There must be placed in charge a responsible, energetic person, with a genuine understanding of the steel workers' problems, who will work in conjunction with an advisory committee representative of the unions supporting the drive.

In order to give speedy effect to these proposals and to work out practical details, we would request an opportunity to confer with you on the subject at your earliest possible convenience. We may point out that already there has unfortunately been too much delay in approaching this question, and we are sincerely anxious for immediate action to organize the steel industry.

Steel Share Prices Show Rise In Demand for Heavy Forms

ARE stocks of steel companies which manufacture the heavier forms of steel appealing more strongly to investors than in the past few years? Is the situation favorable for these stocks to advance more rapidly than they have been doing? Will these stocks be more active in the near future than stocks of steel companies engaged in production of lighter steel products?

At the market level prevailing currently, steel manufacturers engaged most heavily in production of steel rails, structurals, pipe and other materials of this sort stand well at the head of the list of steel shares, as regards price. This classification includes United States Steel Corp., Bethlehem Steel Corp., Inland Steel Co., Jones & Laughlin Steel Corp. and Youngstown Sheet & Tube Co.

As general business has emerged from the depths of the depression, consumer goods have been most active and these have called for lighter forms of steel, strip, sheets, wire and the like. Companies producing these lines of steel have prospered and have shown a sharp upturn in price, in some cases much more marked than in the case of producers of heavy steel.

Since automobile manufacturers have been the first to get back to a level comparable with pre-depression days, their needs have led and have stimulated the output of lighter rolled steel, and this and similar causes have brought about growth in activity of this class of producers.

Building, Railroads Slow

The building industry has been notable in the slowness of its revival, and railroads, except for government stimulated buying several years ago and the more natural demand developing the past two or three months, have been laggard in putting steel tonnage on books.

As a result, the volume of business taken by makers of heavy steel has not been relatively as great as in the case of the lighter steels. Thus these companies have not accumulated the tonnage and have not had the same opportunity to profit.

There are signs that demand for heavy steel is here. Steel companies turning out heavier products, such as those mentioned above, seem in line to have their turn and to taste the fruits of returning prosperity.

Railroad demand is notably stronger, rail commitments in three months

Stock Market Prices of Steel Securities

		Depression Low	1935-36 Low	Current Market	— Per Cent Gain — Over Depression Low	Over 1935-36 Low
United States Steel Corp.	Pref.	51½	73⅝	127⅛	146	72
	Com.	21¼	27½	62⅜	193	126
Bethlehem Steel Corp.	Pref.	16¼	55¾	129¾	698	132
	Com.	7¼	21⅝	57¾	696	166
Jones & Laughlin Steel Corp.	Pref.	30	50	88¼	194	76
Inland Steel Co.	Com.	10	46¼	113½	1035	145
Republic Steel Corp.*	Pref.	...	78½	96	...	22
	Com.	1⅞	9	24¾	1223	175
Youngstown Sheet & Tube Co.	Pref.	25	38½	115	360	200
	Com.	4	13	51⅜	1189	295
National Steel Corp.	Com.	13½	40⅜	69¾	416	72
American Rolling Mill Co.	Com.	3	15¾	33	1000	109
Wheeling Steel Corp.	Pref.	15	45½	108¼	621	137
	Com.	5	14¼	36	620	152
Otis Steel Co.	Pref.	2¼	22¾	94	4077	313
	Com.	½	4¼	19	3700	347
Pittsburgh Steel Co.	Pref.	9½	22⅛	69	626	212
Allegheny Steel Co.	Com.	5	21	37¾	720	95
Gulf States Steel Co.	Pref.	12	28⅜	111	825	326
	Com.	2½	12	41	1540	241

*Preferred stock adjusted, not comparable.

being more than three times those of the corresponding period a year ago, and freight car awards more than 17 times as large. In the building field statistics gathered by STEEL show that bookings so far in 1936 approach double the tonnage sold in the corresponding portion of 1935.

These indications are sufficient to show specific evidence of the fact that business is moving upward in a positive way, in part carried by the general upturn based on increasing confidence in the future and of the natural movement toward capital goods.

In the case of the United States Steel Corp., events of the past few months have shown the intention of that organization to rebuild its plant and personnel to meet conditions of the present (See STEEL, Feb. 24, p. 15). As the pattern of the steel market has changed since the beginning of the depression, so must the pattern of manufacturing and selling change to match. This the Steel corporation is doing faithfully, and the investing public is satisfied with the effort, if present support in the market is a criterion.

Statistics Emphasize Recovery

The accompanying table will repay study from several viewpoints. It presents statistics relating to prices of the stocks of several important steelmaking companies. The current quotations are those prevailing within the past few days and are representative of the recent past. The columns of percentage of gain over the depression low and over the low mark of 1935 and 1936 indicate the rapidity with which recovery in price visited the various companies. This percentage naturally is highest in the cases of those companies whose prices dropped lowest in the depression and least in those whose prices held better when the crash came.

It will be seen that while the five makers of heavy steel noted above stand well at the head of present prices, in per cent of recovery from the low points, they do not show as high a mark. United States Steel, Jones & Laughlin, and Youngstown Sheet & Tube show almost the smallest per cent of gain, while Otis Steel Co. and Gulf States Steel Co. head the list.

In dollars per share gained over the low price of the depression, Bethlehem stands first and Inland Steel Co. second, while United States Steel is well down the list.

The situation seems to be that all steel shares have made remarkable recovery from the depths of the depression and have continued this upward movement in the past few months. Confidence in the industry is being fostered by recognition of efforts by management to make the most of aggressive tactics to hold a high position.

Galvanizers Begin Promotion Program

AMERICAN Hot Dip Galvanizers' Association Inc., Pittsburgh, has announced the results of its recent election of officers.

T. M. Gregory, of Hanlon-Gregory Co., Pittsburgh, has been elected president, and vice presidents are I. M. Herman, of the Acme Galvanizing Co., Milwaukee, and D. R. Pearlman, of the Enterprise Galvanizing Co., Philadelphia. Stuart J. Swensson has been elected secretary and treasurer.

Directors elected, additional to the above four officers, are W. J. Gregory, of the Thomas-Gregory Co., Maspeth, N. Y.; A. J. Blaeser, Joslyn Mfg. & Supply Co., Chicago; F. P. Auxer, National Telephone Supply Co., and P. Ingersoll, of Wilcox-Crittenden & Co., Middletown, Conn.

An advertising committee was elected, consisting of T. M. Gregory, F. A. Olmstead, and Stuart J. Swensson. The board of directors recently authorized the beginning of an advertising campaign for the association in the April issues of several business papers.

At the recent meeting a technical advisory committee was selected, consisting of F. M. Carlson, of the American Tinning & Galvanizing Co., Erie, Pa.; G. H. Koben, of L. O. Koben & Bros. Inc., Jersey City, N. J.; and I. M. Herman, of the Acme Galvanizing Co., Milwaukee. Wallace G. Imhoff was appointed technical director of the association.

The technical director and the technical advisory committee are now revamping the quality of standard specifications for members complying with the association. A new set of standard specifications will be approved, at least tentatively, prior to the beginning of the association's advertising campaign in April. At that time the association's advertising will feature a quality insignia, which also will be adopted for the sole use of qualified members.

Weir Urges Young People To Study Constitution

Speaking over the National Broadcasting Co. red network Feb. 26, E. T. Weir, chairman of the National Steel Corp., Pittsburgh, urged "upon our young people as one of the most vital parts of their preparation for life, that they study our constitution —not as a relic of bygone days, nor as a collection of words that concern only our presidents, legislators, and Supreme Court justices—but with the imaginative realization that this is the charter which establishes and protects the conditions which afford to them personally the greatest opportunities that ever have been available to youth in any country."

He was speaking for the Constitution Educational association, Chicago. He was introduced by James D. Cunningham, president, Republic Flow Meters Co., Chicago, and chairman of the advisory committee of the association.

Carnegie Adjusts Lorain Division

CARNEGIE - ILLINOIS STEEL CORP., Pittsburgh, has announced the further consolidation of its sales activities affecting the Lorain division district sales offices, whereby these divisions will become identified with the present established sales offices at Chicago, Philadelphia, Cleveland, and Pittsburgh.

The following personnel from the former Lorain division has been appointed:

H. H. McDonald, special sales representative, railroad sales division, for the western area, with headquarters at Chicago.

S. J. Cotsworth, assistant manager of sales, Philadelphia.

T. W. Brush, special sales representative, New York.

Otto Fischer, special sales representative, Cleveland.

S. L. Gleeson, special sales representative, Pittsburgh.

Carnegie-Illinois Steel Corp. is also expected to announce realignment soon affecting its Philadelphia, Buffalo, and New York district sales offices. It is proposed to consolidate the territory formerly included in the Buffalo district sales office into that of the Cleveland and New York offices. The Buffalo district sales office proper will be handled out of Cleveland, and the New York office will take the former eastern New York territories of the Buffalo office, including Albany. On the west, Cleveland district sales territory will be extended to the Indiana line.

Picks Bridge Design Jury

American Institute of Steel Construction, 200 Madison avenue, New York, has chosen the following jury to judge its eighth student bridge design competition, making its preliminary review April 15: H. H. Allen, vice president, J. E. Greiner Co., Baltimore; Arthur G. Hayden, designing engineer, Westchester county, park commission, White Plains,

N. Y.; Theodore E. Blake, architect, New York; Archibald Manning Brown, president, Architectural League of New York, and H. H. Saylor, editor, *Architecture*.

Charcoal Stack Being Razed

Cleveland-Cliffs Iron Co., Cleveland, is dismantling its charcoal blast furnace stack, Pioneer No. 2, at Marquette, Mich., having suspended production definitely several months ago. Passing of this stack leaves three charcoal stacks in Michigan and one in Tennessee. The Marquette stack was built in 1901-3 and blown in with annual capacity of 60,000 tons in 1903. It was bought by Cleveland-Cliffs at the end of 1916.

Hits Master's Findings

Department of justice has filed 198 exceptions to the report of the master who recently found that the government owes the Bethlehem Steel Corp., $5,661,154 in a dispute over war shipbuilding contracts. The master also recommended dismissal of government claims for $19,654,856 from Bethlehem. The federal district court in Philadelphia will decide. See STEEL, Feb. 17, page 16.

ALLOWS DRAWBACK ON DRUMS

The treasury department has announced the allowance of drawback on steel drums manufactured by the Atlas Steel Barrel Corp., of Bayonne, N. J., with the use of imported sheets.

Sees Chance for Pacific Coast Steel Industry in New Low Power Cost

A REPORT entitled "Available Raw Materials for a Pacific Coast Iron Industry," by Dr. Edwin T. Hodge, consulting geologist, has just been issued by the North Pacific division, corps of engineers, United States army, 523 Pittock building, Portland, Oreg.

Published in four volumes and containing over 1000 pages, the report was prepared in view of the imminent completion of the Bonneville, Oreg., hydroelectric project. Power at tidewater "at a very low cost" will be available there sometime in 1937. The raw materials investigated were those adapted to electric smelting.

A survey of the Pacific coast led to the conclusion that there is a market there in excess of 1,000,000 tons not now supplied by producers in the western United States, for products that can be competitively produced in comparatively small iron and steel plants.

To produce the amount of additional metal required, according to the report, there will not be available a sufficient supply of scrap. The present production of 1,000,000 tons and the prospective production of another million tons will require metal in excess of the available scrap metal supply. The investigation indicates that the available scrap metal supply is about 1,400,000 tons a year. Hence there will be needed 600,000 tons of new metal derived from ores. It is probable that even more new metal will be required because of the high cost of the present practice of using such a large proportion of scrap metal; that is, two to one.

The report states available iron ore is of a higher grade than that used by the nation as a whole. The supplies average over 60 per cent metallic iron. Hence there will be needed 960,000 tons of ore, which for a 333-day year is 2882 tons a day. The figure of 1000 tons a day requirement is said to be a conservative figure. Cost figures in the report are based upon that quantity.

Other Minerals Studied

Other raw mineral supplies that were studied in considerable detail are wood waste, charcoal, petroleum coke, coal coke, limestone, dolomite, magnesite, silicon, fire clays, chromite and manganese. It is estimated that costs of all raw materials at the furnace in the lower Columbia river valley will not exceed $11.67

When Heating and Ventilating Engineers Were Guests of Crane Co. at One of Its Chicago Plants

The luncheon pictured above was given by Crane Co., Chicago, in one of its plant dining rooms recently when about 200 members attending the fourth international heating and ventilating exposition in Chicago were guests of Crane Co. on a tour through its Chicago works. Standing at the speakers table in the upper left hand corner and reading from left to right are W. K. Glen, manager, heating sales department, Crane Co.; P. R. Mork, vice president, sales division, Crane Co.; G. L. Larson, president, American Society of Heating and Ventilating Engineers; Charles B. Nolte, president, Crane Co.; John Howatt, past president, American Society of Heating and Ventilating Engineers; J. H. Collier, vice president, manufacturing division, Crane Co., and Russell G. Creviston, director advertising and sales promotion, Crane Co.

per ton of pig iron in a plant producing 1000 tons of pig iron per day.

"The lower Columbia river valley has almost a perfect economic setting," says the report. "It is in the geographic center of both the Pacific coast and Far East market and the source of raw materials; it has deep water transportation for both; it has the other geographic and human ingredients for large electrometallurgical industries and it soon will have the cheapest large supply of low cost electric power on tide water in the United States."

Production

STEELMAKING held steady at 54½ per cent last week, for the third consecutive week. Expansion in the Chicago, eastern Pennsylvania, Cincinnati and Buffalo districts offset curtailments at Pittsburgh, Youngstown, Wheeling and New England. Other producing centers were unchanged. It is noteworthy that this rate far exceeds the rates of the comparable weeks of 1932, 1933, 1934 and 1935, which were 25, 17, 48 and 48 per cent, respectively. Further details follow:

Youngstown—Dropped 2 points last week to 63 per cent, and tentative schedules indicate no change at this week's start.

Buffalo—Increased 7 points last week to 42 per cent, due to Bethlehem Steel Corp. adding three furnaces to its active list. Sixteen open hearths are now melting.

Chicago—Increased 3 points to 62 per cent, the highest rate in nearly three months. Most of the improvement results from better production of the heavier products. Blast furnace operations also have been increased, through the resumption at a Gary stack. Twenty of 41 furnaces now are in blast.

Central Eastern Seaboard—Up fractionally to 37½ per cent, highest rate so far this year. Definite improvement in weather, combined with other seasonal influences, should stimulate activity all around in March.

Cincinnati—Rose 4 points to 76 per cent, when one of the two open hearths taken off two weeks ago was restored. Eighteen of 24 open hearths are active. No further adjustment is immediately anticipated.

Birmingham—Unchanged at 66 per cent, with 15 open hearths continuing in production. It is expected this rate will continue for several weeks.

Cleveland-Lorain—Unchanged at 66½ per cent, Republic Steel Corp., and National Tube Co., Lorain, each continuing with 11 open hearths, and Otis Steel Co. with 4. Republic has taken off one blast furnace, operating three. National Tube continues with three of its five stacks, and Otis with both of its stacks.

Wheeling—Off 6 points to 78 per cent, as two open-hearth furnaces were dropped from the active list. Twenty-nine out of 37 open-hearth furnaces were operating in four district plants.

Detroit—Steady at 94 per cent through last week. In the two local plants a total of 16 out of 17 open-hearth furnaces were on producing schedule.

Pittsburgh—Off 1 point to 38 per cent last week. A leading interest, after finishing a schedule at 42 per cent two weeks ago, began operations at 39 per cent last week, but rates of the independents have been tending upward.

Twenty-seven steelworks blast furnaces continue active. Carnegie-Illinois Steel Corp. scheduled 11; Jones & Laughlin Steel Corp., 7; Bethlehem Steel Co., at Johnstown, Pa., 4; National Tube Co., 2, and American Steel & Wire Co., Pittsburgh Crucible Steel Co., and Pittsburgh Steel Co., 1 each.

New England—Down 3 points to 72 per cent, with indications this rate will continue through this week.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Feb. 29	Change	Same week 1935	Same week 1934
Pittsburgh	38	— 1	37	31
Chicago	62	+ 3	53	44
Eastern Pa.	37½	+ ½	29½	30
Youngstown	63	— 2	50	52
Wheeling	78	— 6	78	77
Cleveland	66½	None	74	79
Buffalo	42	+ 7	40	52
Birmingham	66	None	55½	52
New England	72	— 3	63	65
Detroit	94	None	100	79
Cincinnati	76	+ 4	†	†
Average	54½	None	48	48

†Not reported.

SHEET SALES OFF BUT PRODUCTION, SHIPMENTS GAIN

Daily average sheet steel production reported by the National Association of Flat Rolled Steel Manufacturers, Pittsburgh, increased from 6734 net tons in December to 7139 in January. The average for shipments rose from 6292 to 6691 tons, while for sales it dropped from 6558 to 5639 tons. Totals for January: Production, 223,000 tons; shipments, 207,437; sales, 174,805. Total sheet capacity in the United States for January was approximately 500,000 tons, and the capacity on which the association's figures are based was 304,000 tons.

Milsark Now Heads Fabricators Group

INDEPENDENT Steel Fabricators' Traffic association held an enthusiastic and well-attended meeting at the William Penn hotel, Pittsburgh, Feb. 19, at which time officers and an executive committee were elected.

V. E. Milsark, traffic manager of the Parkersburg Rig & Reel Co., Parkersburg, W. Va., was elected chairman and president of the association, and J. B. Keeler, assistant general manager of the Koppers Co., Pittsburgh, was named vice chairman. H. N. Holdren, traffic manager of Pittsburgh-Des Moines Steel Co., Pittsburgh, was named secretary and treasurer, and the following executive committee was elected:

M. A. Keith, general traffic manager, International Stacey Corp., Columbus, O.; S. A. Poyer, traffic manager, Chicago Bridge & Iron Co., Chicago; B. F. Sipes, traffic manager, Firestone Steel Products Co., Akron, O.; E. J. Eldridge, purchasing agent, Truscon Steel Co., Youngstown, O., and H. N. Holdren, traffic manager, Pittsburgh-Des Moines Steel Co.

The association went on record as unalterably opposed to the eastern railroads' recent proposals for widespread changes in fabricated-in-transit rules on steel products in the eastern territory.

To Start Hearing on Anti-Basing Point Bill March 9

Hearing on the Wheeler-Utterback anti-basing point will begin March 9 before the full membership of the senate committee on interstate commerce, in Washington.

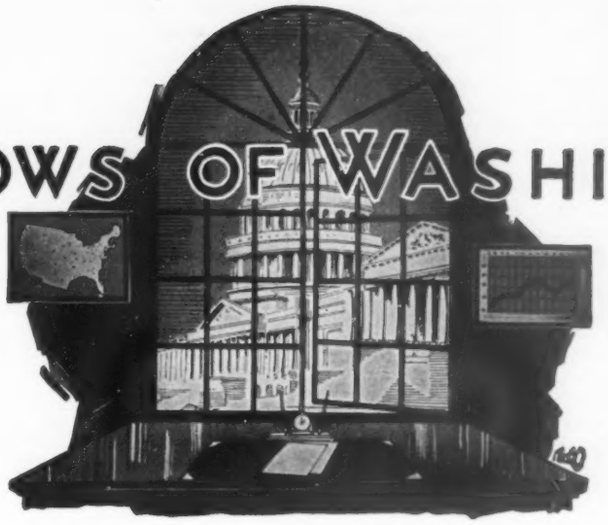
Surprisingly little comment on the bill developed in Washington last week. Senator Wheeler, sponsor of the bill and chairman of the interstate commerce committee, said last week: "If anyone wants to be heard on this bill he will be given a chance."

With a new tax bill to be thrown into the hopper this week, and other weighty matters up, it is generally believed in Washington that the chances are against enacting the bill into law at this session of congress. (See STEEL, Feb. 24, page 14.)

Institute Meets May 28

American Iron and Steel institute, 350 Fifth avenue, New York, has scheduled its forty-fifth general meeting at the Waldorf-Astoria hotel, New York, Thursday, May 28. The program will be announced later.

WINDOWS OF WASHINGTON



WASHINGTON

BOTH the army any navy are making every effort to obtain appropriations from congress, as large as possible, for the modernization of their machine tool equipment, and last week's disturbance in Japan was grist for their mill.

As the army appropriation bill passed the house, some $15,700,000 was allowed for a number of items, including modernization of the ordnance machine tool equipment.

The particular paragraph in which this sum is allowed can be switched around as the army heads desire, but it was testified at the executive hearings on this bill that the department wanted some $2,300,000 for machine tools for the coming year effective July 1.

In the same bill some $29,300,000 was allowed for airplanes and equipment and some $15,700,000 for modernization of automobile and other equipment.

Navy Tools 19 Years Old

In connection with the navy, as this is written, the house appropriations committee has not yet reported out the appropriation bill for that branch of the service, but it is reported the navy will want some $4,250,000 for machine tool and equipment for the various navy yards. It is questionable whether it will be allowed all of this amount.

In connection with the appropriation being asked by the navy for its machine tool replacement, it is pointed out by a person thoroughly conversant with the navy yard situation that expenditures during recent years have not been great enough to reduce the average age of machine tools in the government yards.

Statement is made here by those familiar with the situation that good commercial practice calls for a 10 per cent yearly replacement of machine tools in general. Such a program results in equipment having an average age of 5 years. Today the average age of machine tools in the navy yards, it is reliably reported, is 19 years.

Recommendation was recently made to the navy department, following a survey of the continental navy yards, that $2,500,000 per year be spent for the next 5 years. Such a sum, if spent indefinitely, would bring the average age down to 7½ years.

It is pointed out that when the navy set out to have a replacement program sometime ago it had to be diverted to buy entirely new types of equipment caused by the changing art of working metals. Nearly $1,000,000 alone was spent for welding equipment during the past 5 years.

Last year a request was made on the federal relief administration to set up a project for the purchase of some $25,000,000 worth of machine tools to rehabilitate the various naval shore stations.

This was not made, but if it had been the average age of equipment ashore could have been reduced from 19 years to approximately 10, it is pointed out.

Much of the old and obsolete equipment which is so costly and slow to operate, to say nothing of its inaccuracy, could have been replaced. This money was not allowed because the cost figures on FERA instructions amounted to $21,343 per man per year, while no money would be allowed over $1370 per man per year.

SET MARCH 10 DEADLINE FOR COMPLETING NRA STEEL STUDY

Higher ups at the NRA—if there are any left—have set March 10 as the deadline by which the authors must have their steel study finally completed for submission to the NRA officials.

This means that the steel study, one of the last to be completed, will have to be in by that time, but of course some censoring will be done before the report is submitted to Secretary of Commerce Roper and perhaps eventually to the President.

There is a general feeling here that when all of the NRA material is in the hands of the President he may transmit it to congress for any use it wishes to make of it. Of course, this has not been definitely decided as yet.

Abstract of the preliminary steel report already has been printed in STEEL (Feb. 3, p. 24), and if the remainder of the report is as elemental as the preliminary abstract there is nothing much that the industry can hope for from this so-called study.

While no date has yet been set, it is reported here that Maj. George L. Berry will call a meeting of his business advisory council for sometime during the week of March 9. It is generally believed that this will be the final meeting of the council unless the major can persuade the President of its valuable work—which appears doubtful at this time.

PWA SHIFTS RAILROAD LOAN FUNCTIONS TO RFC

The railroad loan division of PWA, in which Secretary Ickes took so much pride and interest, has been abolished, and the work of that division is now being done through the railroad division of the RFC.

PWA sold RFC railroad securities valued at $186,000,000 and the RFC has already sold $76,000,000 of these securities to the public at a profit to the government of some $4,000,000.

All of the personnel of the PWA railroad division has been transferred to RFC, and along with the personnel railroad committments of $9,000,000 also were transferred for the making of more loans for equipment. In the future, all railroad equipment loans will be made by RFC.

Secretary Ickes has stated that in

his opinion the railroad loans made by PWA are the brightest in the record of that organization. He claims that these loans have made 260,000,000 man-hours of work.

ROAD BUILDERS FIGHT BACK

Road builders have been much distressed because the President has stated that he did not want any appropriations for roads for the coming fiscal year, meaning that the authority granted sometime ago for $125,000,000 for roads would not be allowed.

For the time being, at least, the road builders have won out, because last week when the agricultural appropriation bill was reported out of committee there was the appropriation for $125,000,000 for roads for the coming year.

Of course, the President has plenty of chance to spike this before it becomes law—but the road builders are on the job.

The buff and polishing wheel manufacturing industry has submitted to the federal trade commission trade practice rules for consideration and approval. The commission has announced that an oral hearing on these rules will be held on March 2 at which time anyone wishing may present their views, either for or against the proposed rules.

Application for the trade practice conference and for approval of the proposed rules was presented by the Buff and Polishing Wheel Manufacturers Association Inc., claiming to represent 66 per cent of the total number of firms engaged in manufacturing and selling buffs and polishing wheels.

Steel Corp. and Pittsburgh Coal Trade Mine Acreage

Pittsburgh Coal Co., Pittsburgh, and two subsidiaries of the United States Steel Corp.—H. C. Frick Coke Co. and National Mining Co., both of Pittsburgh—have completed an exchange of coal lands in Allegheny and Washington counties, Pennsylvania, by which holdings of each have been consolidated, with the result that access to coal will be more advantageous for each owner.

Pittsburgh Coal Co. has exchanged its Catsburg field of about 11,000,000 tons of unmined gas and by-product coal for an equal tonnage in the Maple Creek field of the Frick company, which adjoins the former's Crescent property. This newly acquired coal can be reached through existing mine workings without need of opening a new mine.

Pittsburgh Coal Co. also has exchanged about 6,000,000 tons of unmined coal south of Bridgeville, Pa., adjoining holdings of the National Mining Co., for an equal tonnage in the Mingo field of the latter, which adjoins holdings of the Pittsburgh company, again offering access through existing workings.

Expansion of the Pittsburgh Coal Co.'s Crescent No. 2 mine has been started, to attain capacity of 4000 tons per day for river shipment. This company by the exchange has river access to a much larger tonnage of coal, which can be handled direct through its present mine facilities.

Republic Buys Into Wickwire

REPUBLIC STEEL CORP., Cleveland, will have a stock interest of 9 to 10 per cent in the Wickwire Spencer Steel Corp., New York, if the proposed reorganization is approved.

It developed at a hearing in federal court in Buffalo last week that the Buffalo brokerage firm of Schoellkopf, Hutton & Pomeroy purchased $3,040,000 of class B Wickwire Spencer notes which, after exchange into proposed new stock, will be turned over to Republic. It also developed that Republic outbid Bethlehem Steel Corp. for this interest.

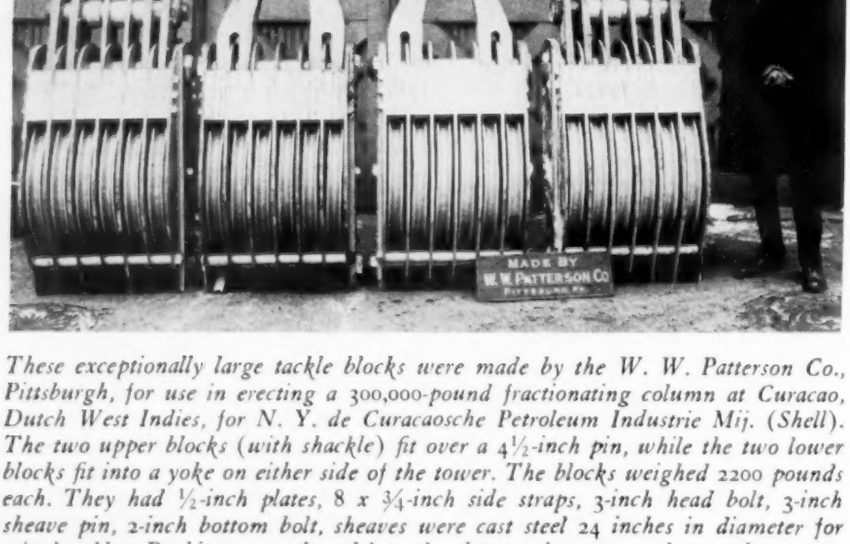
More than the necessary two-thirds sanction for the reorganization plan has been obtained. A decision was reserved after minority groups opposed the plan, with an appeal to the courts possible.

Wickwire Spencer's name will be changed to Spencer Wire Products. It has plants at Tonawanda, N. Y., and Worcester, Palmer and Clinton, Mass. Its annual capacity includes 324,000 tons of pig iron, 150,000 tons of ingots, and finishing capacity, principally for cold-rolled strip and wire products, aggregating 351,125 tons.

Steel Made Stainless by Impregnating with Silicon

A new process for rendering ordinary carbon steel immune to corrosion is being placed in commercial operation by the Globe Steel Tubes Co., Milwaukee. The process, called Ihrigizing, after Dr. H. K. Ihrig, chemical engineer of the company, consists of impregnating the steel with silicon, usually to a depth of 0.020 to 0.030-inch. After treatment the core of the metal still may be heat treated. The surface will take a high polish, is highly resistant to the more severe corrosive agents, and the "siliconized" product is said to cost about half as much as stainless steel.

Record Tackle Blocks for South American Use



These exceptionally large tackle blocks were made by the W. W. Patterson Co., Pittsburgh, for use in erecting a 300,000-pound fractionating column at Curacao, Dutch West Indies, for N. Y. de Curacaosche Petroleum Industrie Mij. (Shell). The two upper blocks (with shackle) fit over a 4½-inch pin, while the two lower blocks fit into a yoke on either side of the tower. The blocks weighed 2200 pounds each. They had ½-inch plates, 8 x ¾-inch side straps, 3-inch head bolt, 3-inch sheave pin, 2-inch bottom bolt, sheaves were cast steel 24 inches in diameter for 1-inch cable. Bushings were keyed into the sheaves; between each two plates were four extra heavy cast iron separators through which were eight heavy bolts. The lower block had two 8 x ¾-inch straps in the middle and four 8 x ¼-inch straps on the outside. The two eyes of the yoke fit between the four outside 8 x 1¼-inch hanger straps. The blocks were shipped 16 days after receipt of order. Standing at the right is W. W. Patterson Jr., owner of the business and son of W. W. Paterson, the founder

Financial

JONES & LAUGHLIN STEEL CORP., Pittsburgh, Feb. 26 registered a proposed issue of $40,000,000 of first mortgage bonds—the largest issue yet to be filed with SEC under the new securities act.

Interest rate, price and identity of the underwriters have not yet been determined. Of the issue, $31,500,000 will be expended for a new continuous wide strip-sheet mill and other improvements.

A report was current last week that the Mesta Machine Co., West Homestead, Pa., had received the contract for the new continuous mill, but Jones & Laughlin officials stated contracts will not be placed for a week or ten days.

Jones & Laughlin disclosed last week that its net loss for 1935 was $398,775, compared with a deficit of $2,751,372 in 1934.

NOW IS SHARON STEEL CORP.

Stockholders of Sharon Steel Hoop Co., Sharon, Pa., Feb. 27 ratified changing the name to Sharon Steel Corp. and approved refunding $5,328,500 5 per cent bonds with $2,000,000 4½ per cent convertible debentures and 40,000 shares of 5 per cent preferred stock.

Sharon also reported last week that its net in 1935 was $1,009,152, compared with a loss of $36,527 in 1934.

Henry A. Roemer, president of Sharon, is also president of Pittsburgh Steel Co., in which Sharon now has a large stock interest.

YOUNGSTOWN PLANS TO REFUND

Directors of the Youngstown Sheet & Tube Co., Youngstown, O., are considering refunding $84,962,000 outstanding first mortgage 5 per cent bonds in order to take advantage of present low interest rates. Although plans for such refunding have not yet been definitely adopted, a special meeting of shareholders will be held March 31 to authorize at least part of the new securities in the form of debentures convertible into common shares. Holders of present common shares will be asked to release their pre-emptive rights on 600,000 authorized and unissued common shares.

OTIS TO CUT FIXED CHARGES

Shareholders of the Otis Steel Co., Cleveland, at a meeting to be held March 27, will pass upon the financing program approved by directors of the company. This program involves the sale of $13,000,000 of new 20-year 4½ per cent first mortgage bonds to a group of investment bankers. The proceeds of the financing will be used to retire all of the funded indebtedness of the company, including its first mortgage 6 per cent bonds, notes owing to banks and funded taxes.

LUDLUM WILL EXERCISE RIGHT TO CALL PREFERRED

Ludlum Steel Co., Watervliet, N. Y., proposes to exercise its right to call its preferred stock at $110, which would automatically result in its preferred stockholders exchanging their shares for common at the rate of 5 for 1. With the common quoted at $32.50 at the close of the market Feb. 28, the current value of the 6½ per cent preferred is $163.50. Common stockholders will be given rights to subscribe to new common, to pay the balance of the purchase price of the Wallingford Steel Co. There are 43,723 outstanding shares of preferred.

The conversion plan will be acted upon by stockholders at their meeting March 16.

Ludlum and its subsidiaries, including Wallingford from Nov. 12 on, earned $637,729 in 1935, an increase of 44 per cent over 1934 and with the exception of 1929 the most profitable year in the company's history. Ludlum's sales total, not including that of subsidiaries, in 1935 was $5,994,285, a gain of 27 per cent over 1934.

Activities of Steel Users and Makers

LINCOLN ELECTRIC CO., Cleveland, announces moving of its Pittsburgh office, formerly at 323 Fourth avenue, to larger quarters at 926 Manchester boulevard.

The new location contains 1000 feet of floor space for storing and displaying arc welders, electrodes and supplies and, because of its ready access from all parts of the city, will afford prompt service to all users of arc welding in the Pittsburgh district.

Personnel includes F. M. Maichle, district manager: W. R. Persons and H. E. White, sales engineers; and Miss Esther Lee, in charge of the order department.

♦ ♦ ♦

Steelduct Co., J. H. Collier president, has removed its general offices to the Republic building, Youngstown, O.

♦ ♦ ♦

National Machine Tool Buiders' association, Cleveland, has moved from 1220 Guarantee Title building, to 10525 Carnegie avenue. This change was effective Feb. 15.

♦ ♦ ♦

Demmler Bros. Co., Ross street, Pittsburgh, jobber of sheet metal, hardware, etc., asked federal court permission, Feb. 26, to reorganize under 77-B of the bankruptcy act. R. H. Coleman and Frank Demmler were named temporary trustees.

♦ ♦ ♦

Crown Cork & Seal Co., Baltimore, has entered the canmaking industry with its recent acquisition of the Acme Can Co., Philadelphia.

♦ ♦ ♦

Timken Detroit Axle Co., Detroit, has purchased all of the assets, subject to liabilities, of Timken Silent Automatic Co., manufacturer of oil burners and accessories. The latter's operations will be conducted as the Timken Silent Automatic division of the Axle company.

A.F.A. Arranges Meeting Program

AN INTERESTING and comprehensive program is being arranged for the fortieth annual convention of the American Foundrymen's association to be held in Detroit, May 5-9. Concurrent with the convention, the association will conduct a Foundry and Allied Industries exhibition in Convention Hall.

According to the tentative program just announced, the session of outstanding importance to executives will be a symposium on "Progress of Engineering, Medical and Legislative Aspects of Safety and Hygiene in the Foundry Industry," sponsored by the association's recently formed safety and hygiene section.

Technical sessions and roundtable luncheons will be devoted to cast iron, malleable iron, steel and nonferrous fields. Among subjects to be considered at the cast iron sessions are cupola practice, metallurgy, and alloy iron. Other sessions will be devoted to apprentice training, refractories, and sand control and research.

Two shop operation courses will be conducted during the week, one on cast iron and the other on practical sand control. A series of plant visitations is being arranged.

Foreign Trade

EXPORTS of steel products in January were 241,348 gross tons, compared with 239,268 gross tons in December, according to compilations of the metals and minerals division of the department of commerce, Washington. This is the largest total for any month since September, 1935.

Scrap accounted for 158,962 gross tons, which is 65.8 per cent of the total; semifinished, finished steel and ferroalloys comprising the remainder, 82,416 tons. In December scrap exports were 142,135 gross tons.

DETROIT

ANY river man will tell you that an ice gorge is something that rears up its frigid tonnage to an astounding bulk during a cold spell, and then, with a thaw, breaks suddenly wide open into a flood stage.

Something like an automobile gorge has been forming all over the country for the past arctic month. In the form of pentup demand that grows cumulative day-by-day, a latent thrust for automobiles in the retail field will soon reach flood stage.

At least, that's the way the motor people feel. These weeks of cold have only dammed up the inevitable, and when they pass the industry will go the palmy days of November and January, 1935, one better.

For this stand you have to have faith, for it is no heartening trip to visit the assembly lines today. The 4-day week is indeed the exception in the motor plants, as assemblies here today average closer to two days weekly.

But March 1 is gone, the back of the winter is broken, and so last week the motor industry was laying plans.

March Winds Bring Cheer

None in informed circles here will contest that March assemblies will be ahead of February. The latter is conceded a writeoff, but some 65 per cent of January, yet a month that will go down as the groundwork for a spring bulge.

At plants here there has occurred more hustle and bustle the last week. To cite a few examples: Ford has set on 100,000 assemblies in March, against 65,000, in round figures, for February, 90,000 in January, and 105,000 for December.

Though Ford assembly lines last week only worked on Tuesday, Wednesday, and Thursday, the manufacturing divisions at Rouge were on a fuller week, banking parts. Ford is generally credited with having a full 27 to 30-day parts' bank on hand.

Chevrolet divisions, like gear and axle, worked four days last week, though here again the company's assembly line rate was less. In Chevrolet's case, their parts' bank is now some 75,000 sets of transmissions, axles, motors, and other integral parts, and is rising.

Fisher Body at Cleveland went to a 5-day week last Wednesday, working up panel and other sheet metal work, mostly for Chevrolet. Some of the automobile hardware interests, like Ternstedt, and the tubing makers like Bundy, are slowly throwing off the February shackles.

New Models Before Fall

All of which, in a nutshell, means the preparation for a spring drive calculated to last from late March into June. By July or August there should be a reaction for a swingover into 1937 models—so the cycle functions.

The 1937 cars may be out before this fall, judging from the advanced stages most plans are in. It is significant to note that divisions at Fisher Body that have authority for tool and die expenditures were asked to have their 1937 vacations over with by March 1.

Chevrolet now has an extensive buying program in equipment for Flint behind it. Because this General Motors unit is at such an advanced position on next year's car, there are many in Detroit who think it can be thrown into the breach late in the summer, if the high command gives the word.

There is no doubt that the 1937 car could be put on the lines a month or two earlier than was this year's model. The shows are not officially scheduled until November, but die contracts are out, retooling contracts have been negotiated for the new motor and preparations generally are on the march eight months preceding.

True, this advanced work is moving slowly, but purposely so. Die programs were predetermined to last six months, against three in many former years. The idea seems to be to take the jumps more leisurely.

It is certain that Chevrolet's body appearance will clearly distinguish it from today's job. Detroit has been talking up great things for Chevrolet, understands most of the panel work specifications are to be changed, and that more steel will be used, replacing wood in the flooring and other parts.

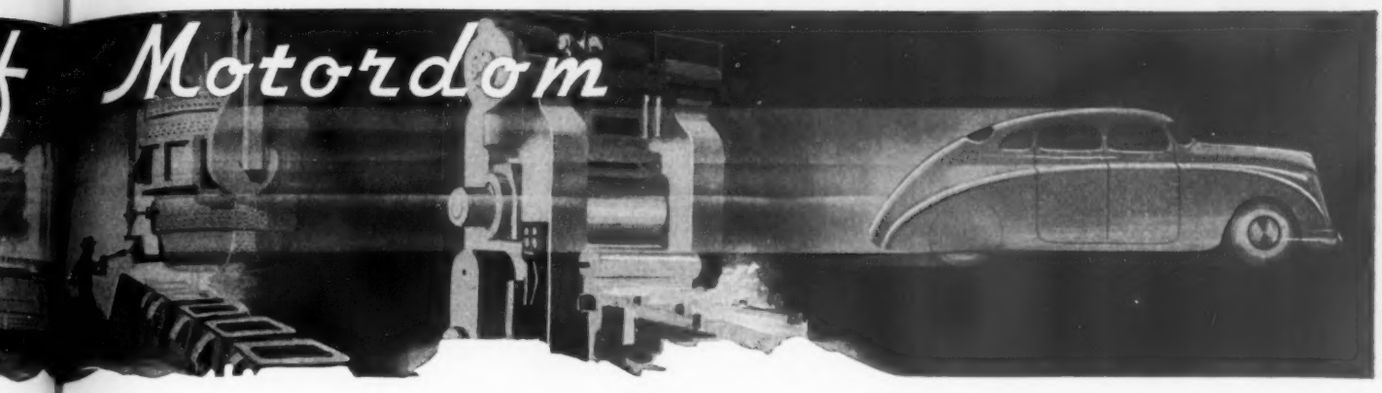
Of the motor, a number of component parts have undergone the microscope and been redesigned. Recent remarks of a Chevrolet spokesman before the S. A. E. at Detroit may give a hint as to what Chevrolet thinks is an imperative change in motor design—that gasoline consumption should be cut down for the higher motor speeds. These remarks dovetail with the Chevrolet policy of hitting hard on economy in motor car operation and further confirm that next year's power plant will still be a six.

Steel Top for Ford

Because Chevrolet's 1937 plans are in such an advanced stage, Ford has been putting the pressure on, not to be caught napping. The 1937 Ford V-8 design may show the influence of big-brother Lincoln-Zephyr, because certain body curves will be borrowed, and there is sure to be an all-steel top for the V-8 next year, but from a practical manufacturing standpoint, Rouge headquarters won't O. K. a bridge-deck frame for the V-8, such as the Zephyr has.

Up with Chevrolet in having plans in an advanced stage is Buick, which by now has placed most of the die work; allowing for the normal course, it could be ready by late summer with the 1937 lines.

Most of the remainder of the Fisher die work is delayed. In January the die makers were promised orders by March 1, but now the word is that March 15 and no earlier will see



most of the new requirements come through. Much Fisher die work will go to outside shops.

Chrysler, at the Dodge engineering division, still is quiet, and only a skeleton crew is on the tool and die shop payroll. Much of their projected work for Plymouth, Chrysler, DeSoto, and Dodge is still on the drafting room boards.

Meanwhile, the actual assembly story is slightly sad to relate. There were a lot of long weekends in Detroit's plants in February.

Packard, after being closed week before last, had a spotty schedule last week of about three day's assembly. However, it has changed its 4500-unit appraisal of March production upward to a hope for 6000.

Ford, as related, assembled three days; Chevrolet likewise. Plymouth worked two; Dodge, Chrysler, and DeSoto lines, three. Olds and Pontiac each did their three days, then closed. Incidentally, much of Pontiac's problem this year seems to be more than the weather—Detroit says Buick's success has cut a wide swath in the Pontiac market.

Other Production Figures

Ford made about 4000 models each of those days last week, Chevrolet did around 4200 per day. Chrysler averaged 300 Airflows and Airstreams per day, Dodge was close to 900 jobs daily, Plymouth about 1800 models each day. Olds accounted for 700 a day, Pontiac and Buick each 600.

At Hudson the rate was 700 per day, three days, but in common with competitors Hudson executives were cheerful for a thaw in more ways than one within two weeks. Companies like Briggs, Murray, and Budd all worked closely in line with their big customers' rates, Ford and Chrysler.

The procedure at Briggs, for example, was to operate only one day at a time. Local shippers of parts called up at 8:30 a.m. and asked if it were going to work that day. Last week Kelsey-Hayes foundry was down to one day's work.

Surprising as it may seem, in this dip that the low and middle-priced cars have taken, Packard and Lincoln are in no comparable lull. Lincoln worked five days on the Zephyr, getting 125 a day off and even hit a peak of 133 a day ten days ago. One day was lost recently due to a shortage of freight cars for outbound shipments.

Packard, of course, is preponderantly the 120 series, and in the background is still the small six. Each week further details come to light, latest development being that the car may be out by August or September.

Other daily assembly rates last week were: Studebaker, 350; Reo, 100; Nash, 125; Cadillac-LaSalle, 100; Graham, 100; and Auburn-Cord, 20. Multiply each of these by the number of days worked, but don't use more than the figure three, and you have the week's sum.

The automobile industry probably learned a good deal from old man winter this year. Bitter experience is a good teacher—ice and snow brought a lot of mechanical faults to the surface.

The die shops right now can lick their chops and inquire for pig iron and say they'll be booked up on 1937 work in another few weeks, but some of them have been getting new die work for 1936 cars, and of course for immediate delivery.

That is, a few minor die jobs have been placed for fabricating more rugged underframe parts at once. Center-road ice ruts have driven home the vulnerability of some frames, crankcases, and sheet metal housings. In numbers of cars in service this winter these parts have been bent and dinged.

Service Teaches Lessons

Perhaps the cold weather will also shift attention to better braking, the relation of horsepower to tire surface, improved batteries and generators, and the other vulnerable parts that balked when the mercury dipped under zero.

Some of the car producers had a trump to play when, like Chevrolet last week, they made large-diameter wheels available to give extra road clearance.

Chevrolet said it would put 19-inch wheels on its standard models for the purchaser to ride unimproved roads, lanes or rutted snow surfaces, these wheels being 2 inches larger than normal. Plymouth and Ford also have "high-boy" models on the market.

Hudson-Terraplane on Feb. 25 installed a new president, A. Edward Barit, who held onto one of his former titles, general manager. Hudson also advanced Stuart Baits, making him first vice president and assistant general manager. . . . Willys started up its forge shop operations

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1934	1935	1936
Jan.	155,666	292,785	367,252
Feb.	230,256	335,667	.....
Mar.	338,434	429,793	.....
Apr.	352,975	477,691	.....
May	330,455	364,662	.....
June	306,477	361,248	.....
July	264,933	336,985	.....
Aug.	234,811	239,994	.....
Sept.	170,007	89,804	.....
Oct.	131,991	275,024	.....
Nov.	83,482	398,039	.....
Dec.	153,624	407,804	.....
Year	2,753,111	4,009,496	.....

Estimated by *Cram's Reports*

Week ended:	
Feb. 1	85,790
Feb. 8	69,876
Feb. 15	75,170
Feb. 22	62,813
Feb. 29	64,956

at Toledo with about 400 employed. . . . Oldsmobile wants bids no later than March 2 on a laboratory building that takes 800 tons of structural steel. . . . Most of the 8000 employes at Fisher Body's Cleveland plant will have hours lengthened this week when a 5-day week goes in. . . . Moto-Meter Gage, division of Electric Auto-lite, is down, taking inventory. . . . Kermath Mfg. Co. has introduced three new heavy-type diesel engines. . . . Studebaker has shipped 45,000 cars since March 9, 1935, and gross sales have been almost $34,000,000. . . . Toledo partsmakers reported an increase in employment last week to almost 17,000 for 51 reporting members. . . . Maturity of General Motors' 1930 savings fund last week dumped about $11,000,000 into the laps of 25,000. Each got more than 100 per cent return, for on a total of $4,800,000 savings, $6,200,000 was added in interest and stock dividends. The 1930 class was the twelfth G. M. class that has matured. . . . Six out of every ten families have an automobile, according to Hudson-Terraplane. . . . Electric Auto-Lite has gone to court rather than tell SEC too many details of its business in connection with a refunding issue. The guess is that Auto-Lite does not want to reveal its trade secrets because of its proposed expansion into the spark plug, air cleaner and collateral parts field. . . . Deliveries of White and Indiana trucks and buses in January were double those of a year ago.

New Bethlehem Plan Is Ratified

INTER-CORPORATE merger of the Bethlehem Steel Corp. was approved by stockholders at a meeting in Newark, N. J., Feb. 25. The Kalman Steel Corp. of Delaware, the Bethlehem Mines Corp., also a Delaware corporation, the Union Iron Works Co. of New Jersey and the Bethlehem Steel Corp. of Delaware will, as a result, be merged under the name of the Bethlehem Steel Corp. of Delaware.

This action, to be effective as soon as legal formalities are completed, results, for one thing, from the revised tax law which no longer sanctions the filing of consolidated returns. All Bethlehem business will be booked in the name of parent companies instead of subsidiaries. The consolidation will also facilitate a plan to take care of accumulations on the 7 per cent preferred stock.

The new corporation will also have a revised incentive compensation plan, replacing the bonus system of the past. Under this new plan, 5 per cent of the consolidated net income after all charges and preferred and common dividends will be deposited in a special fund, of which an amount equal to 1/15 of the aggregate cash dividends paid in any year on the common stock can be paid to executives and others sharing in the distribution. Under the old system, 8 per cent of the net after preferred dividends could be distributed.

While proposals presented met with opposition from minority groups, they were overwhelmingly approved as a part of the general plan, which received a vote of 692,927 shares of preferred and 2,403,908 shares of common in favor, against 3160 shares of preferred and 450 of common opposed.

Under the new refinancing plan, back dividends of $21 a share of the 7 per cent preferred stock as of April 1, this year, will be wiped out by the distribution of one share of new $20 5 per cent cumulative preferred stock, share for share, calling for an issue of 933,887 shares of the new stock, and the payment of $1 a share in cash.

Died:

JAMES E. FERRIS, 66, former vice president, secretary and treasurer of the Corrigan, McKinney Steel Co., now a part of Republic Steel Corp., Cleveland, in Cleveland, Feb. 27. Mr. Ferris started as an accountant with Corrigan-McKinney shortly after he was graduated from the University of Michigan in 1892. At the time of his retirement in 1928 he held the positions of vice president, secretary and treasurer.

♦ ♦ ♦

Joseph Stauffer, 82, vice president of the Galt Art Metal Co., and pioneer metal manufacturer of Galt, Ont., in that city, Feb. 18.

♦ ♦ ♦

Andrew Jackson Post, 64, president of the steel contracting firm of Post & McCord Inc., New York, in that city, Feb. 25.

♦ ♦ ♦

Thomas A. Hollinrake, 68, president, A. R. Williams Co. Ltd., Toronto, Ont., machinery manufacturer, in Toronto, Feb. 16.

♦ ♦ ♦

W. J. Cummins, 74, chairman of the board, Tennessee Products Corp., Nashville, Tenn., in Chicago, Feb. 24, while on a visit.

♦ ♦ ♦

Samuel Schwartz, 70, president of the Schwartz Mfg. Co., Two Rivers, Wis., manufacturer of buffing and polishing wheels, in Miami, Fla., recently.

♦ ♦ ♦

St. George Mason Anderson, 62, superintendent of the foundry and machine shops of the Tredegar Co., Richmond, Va., in Richmond, Feb. 24. He was the son of the late Col. Archer Anderson, who was president of the Tredegar Co.

♦ ♦ ♦

Frank Hall Tuthill, president, Tuthill Spring Co., Chicago, in Evanston, Ill., Feb. 24. Mr. Tuthill, with his brother William, organized the Tuthill Spring Co. in 1880, and he served as president of the company continuously for 56 years.

♦ ♦ ♦

James Fitzgerald, 71, one of the founders of the Fanner Mfg. Co., Cleveland, in that city, Feb. 26. Mr. Fitzgerald had been connected with the Fanner company since he came to the United States more than 40 years ago.

♦ ♦ ♦

J. G. Matthews, 74, president, Berea Machine & Tool Works, Berea, O., Feb. 25. He was formerly affiliated with the Cleveland Twist Drill Co., and taught mechanical drawing at East Technical High school, Cleveland, from 1908 to 1920, when he founded his company in Berea.

♦ ♦ ♦

Dawson H. Skeen, 48, president, D. H. Skeen & Co., Chicago, power equipment sales engineers, in Flossmoor, Ill., Feb. 23. Mr. Skeen formerly was assistant to the president of the Edward Valve & Mfg. Co. Inc., East Chicago, Ind. He was a member of the American Society of Mechanical Engineers and the Western Society of Engineers.

♦ ♦ ♦

Gustav Gulbrandsen, 72, bridge designer, Bethlehem Steel Corp., Bethlehem, Pa., in that city, Feb. 19. A native of Oslo, Norway, he came to America in 1886 and settled in Philadelphia. In 1905 he became associated with the Pennsylvania Steel Co., Philadelphia, and when that company was merged with the Bethlehem Steel Corp. in 1923, he moved to Bethlehem.

♦ ♦ ♦

George H. Letz, 50, president of the Letz Mfg. Co., Crown Point, Ind., manufacturer of farm implements, in Chicago, Feb. 25. The company was founded 50 years ago by his father, Louis H. Letz. He was a graduate of Armour Institute of Technology, Chicago, and for the past three years was treasurer of Valparaiso university, Valparaiso, Ind.

♦ ♦ ♦

John H. Means, 73, pioneer blast furnace superintendent, in Mayville, Wis., Feb. 17. He was a native of South Carolina, and after 18 years with steel companies in Birmingham, Ala., he became associated with the old Mayville Iron Works as general superintendent, retiring in the fall of 1927 when the industry was liquidated and the plant abandoned and wrecked.

Men of Industry

JOSEPH B. CLOUGH, who has been in the research department of E. I. du Pont de Nemours & Co., Wilmington, Del., since 1933, has been appointed to represent the Johnston & Jennings Co., Cleveland, in the flat die forging industry beginning March 1. He is the son of Joseph Burt Clough, for 20 years manager of the forge department of that company, who died Feb. 15.

A graduate in 1927 of the Cleveland Heights (O.) high school, Mr. Clough attended Case School of Applied Science in Cleveland, receiving his B. S. degree in 1931. Following two years' study at the engineering school of Harvard university, Cambridge, Mass., he was awarded his doctor's degree in 1933. Since then he has been engaged in research and experimental work for the du Pont interest at Wilmington.

Joseph B. Clough

♦ ♦ ♦

Roy Cole has been appointed chief engineer in direct charge of all engineering of the Studebaker Corp., South Bend, Ind. He has been associated with the automotive industry for many years in various important posts.

♦ ♦ ♦

Charles R. Surface has been appointed sales manager of the electric motor division of the Harnischfeger Corp., Milwaukee. He formerly had been connected with the Westinghouse Electric & Mfg. Co., in charge of the building equipment department, and the industrial division in the Chicago district office, and previous to that was with the Sprague works of General Electric Co.

♦ ♦ ♦

R. S. Brown has been appointed eastern sales representative of the National Automatic Tool Co., Richmond, Ind., manufacturer of drilling, boring and tapping machines, with headquarters in New York. A graduate of the University of Cincinnati, in the school of mechanical engineering, Mr. Brown has been identified with the sales organization of National Automatic Tool in the home office for the past several years.

Mr. Brown succeeds C. H. Briggs, who, as of March 1, became manager of the Syracuse, N. Y., office of Henry Prentiss & Co., eastern machinery dealer.

♦ ♦ ♦

Laird U. Park, Real Estate Trust building, Philadelphia, has been appointed Philadelphia district representative of James S. McKesson, Pittsburgh, special agent for the sale of pig iron produced by the Carnegie-Illinois Steel Corp. Mr. Park has long been identified with the trade.

♦ ♦ ♦

P. Damiron, a member of the firm A. T. Kathner, P. Damiron, Paris, consulting engineers, sailed for the the United States Feb. 26 to spend three or four weeks investigating new processes which might be interesting for introduction in Europe. He will make his headquarters in Youngstown, O., during his stay here.

♦ ♦ ♦

Francis J. LaPointe, formerly president of the American Broach & Machine Co., Ann Arbor, Mich., has been named a vice president of the Sundstrand Machine Tool Co., Rockford, Ill., which has acquired the American Broach company.

D. A. DeLong, formerly secretary of the American Broach company, has been elected assistant treasurer of the Sundstrand company. Other officers are Hugo L. Olson, president; Levin Faust, vice president; George A. Lindblade, secretary and treasurer, and Gust H. Ekstrom, assistant secretary and treasurer.

♦ ♦ ♦

Ernest C. Kron, a graduate of the University of Minnesota in 1930, has joined the staff of Battelle Memorial institute, Columbus, O. Mr. Kron, who has been a steel mill metallurgist since graduation, has been assigned to the division of process metallurgy at Battelle.

♦ ♦ ♦

Howard E. Robinson, has been elected vice president in charge of sales of the Otis Steel Co., Cleveland, to succeed Paul B. Allen, who resigned last week.

Born near Connellsville, Pa., he started his career in the iron and steel industry in 1910, with the Allegheny Steel Co., and continued there until 1917, when he enlisted in the army and saw service in France. On his return in 1919 he rejoined Allegheny, and in 1920, with the formation of the Newton Steel Co., became associated with the new firm as a sales representative in the eastern district, with headquarters in New York. For the next several years he was in the Detroit and Chicago districts, becoming district sales manager in the latter city. In 1925 he was transferred to the main office of Newton at Youngstown, as assistant manager of sales; was elected general manager of sales in 1927, and vice president in 1932.

Howard E. Robinson

He continued with Newton after its merger with Corrigan, McKinney Steel Co. until June, 1935, when he resigned to join Otis as general manager of sales.

♦ ♦ ♦

S. A. Koegle, formerly superintendent of tin mills for Jones & Laughlin Steel Corp., Pittsburgh, has been placed in charge of the tin plate department of Inland Steel Co., Chicago.

♦ ♦ ♦

A. E. Barit, formerly vice president and general manager of Hudson Motor Car Co., has been elected president, succeeding Roy D. Chapin, who died recently.

Stuart G. Baits has been elected

first vice president and assistant general manager, and H. M. Northrup, chief engineer, Hudson Motor Car Co., has been elected a director.

♦ ♦ ♦

A. D. Brown has been appointed manager of the Los Angeles district office of Allis-Chalmers Mfg. Co., Milwaukee, to fill the vacancy caused by the sudden death of Boyd Anderson. Mr. Brown for many years was manager of the company's Buffalo district office.

H. E. Weiss has been appointed manager of Allis-Chalmers Buffalo district office, succeeding Mr. Brown. Mr. Weiss was formerly manager of the company's Salt Lake district office.

♦ ♦ ♦

A. M. Steever has been appointed superintendent of the plant of the

George A. Spaulding

Formerly sales manager in charge of eastern sales of Bliss & Laughlin Inc., Harvey, Ill., who, as noted in STEEL for Feb. 24, has been made vice president in charge of eastern activities

Columbia Tool Steel Co. at Chicago Heights, Ill. For the past two years Mr. Steever was associated with the Lindberg Steel Treating Co., and the Lindberg Engineering Co., Chicago, and still retains his directorship in the latter.

He began his career with the Buick Motor Co., Flint, Mich., later joining the first metallurgical division established by the Chevrolet Motor Co. in that city. Following this connection, Mr. Steever joined the United States aircraft metallurgical inspection and control service. Later, he rejoined the Buick Motor Co., followed by a period of service with the Wyman-Gordon Co., Ingalls-Shepard division, Harvey, Ill. For seven years Mr. Steever was with the Great Lakes Forging Co., Chicago, as product and equipment metallurgist, following which he was associated with the Lindberg companies.

He is a member of various engineering societies and served as Chicago chapter chairman of the American Society for Metals in 1928-29. He has also presented various papers before technical groups on the subject of forgings of various materials.

♦ ♦ ♦

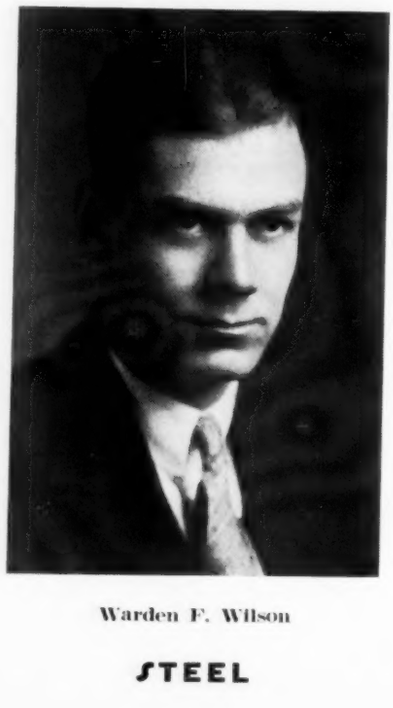
Walter J. Miller, since 1930 Pittsburgh district manager of sales and production of American Steel Foundries, has resigned to become president and general manager of the Keokuk Steel Castings Co., Keokuk, Iowa.

Owsley Brown, president of the Springfield Boiler Co., Springfield, Ill., and chairman and president of the Keokuk company, retains a substantial interest in the company and is to be first vice president under the new arrangement.

Walter O. Parham, long associated with Mr. Miller, has been elected second vice president, and Edward J. Walsh, who has been works auditor in the Pittsburgh district for American Steel Foundries since 1926, goes to the Keokuk company as secretary and treasurer.

Mr. Miller has been engaged in the steel foundry business since shortly after his graduation from the University of Minnesota in 1914. His connection with American Steel Foundries, and that of Mr. Parham, began in 1928 when that company acquired Northwestern Steel & Iron Corp., Minneapolis, of which Mr. Miller was president and Mr. Parham vice president.

Warden F. Wilson has been appointed manager of the Pittsburgh plant of American Steel Foundries, effective March 1, to succeed Mr. Miller. Mr. Wilson has been with



Warden F. Wilson

American Steel Foundries since his graduation from Illinois university, and had been assistant manager of its plant at East Chicago, Ind., since April, 1929.

L. R. Meyer has been appointed superintendent.

♦ ♦ ♦

Ralph W. Bergen, 328 Chestnut street, Philadelphia, has been appointed representative by Illinois Testing Laboratories Inc., Chicago, manufacturer of "Alnor" and "Price" pyrometers and the Velometer, for measuring air velocity, in Maryland, Delaware, southern New Jersey, and eastern Pennsylvania.

♦ ♦ ♦

R. R. Cooley has been made production manager of the Cooley Electric Furnace Co., Indianapolis. Mr.

C. L. Huff

Elected vice president in charge of sales of Bliss & Laughlin Inc., Harvey, Ill., as announced in STEEL for Feb. 24. He formerly was sales manager in charge of western sales

Cooley received his education at Purdue university, and for many years was employed in the study and application of refractories. He is a brother of W. B. Cooley, president of the company.

♦ ♦ ♦

John E. Frederick, chairman, Continental Steel Corp., Kokomo, Ind., is confined in a Miami, Fla., hospital after being stricken aboard a ship en route to South America.

♦ ♦ ♦

G. R. Sharpley, managing director of Ruston & Jornsby Ltd., Lincoln, England, and a director of Ruston-Bucyrus Ltd., British affiliate of the Bucyrus-Erie Co., South Milwaukee, Wis., has been spending some time in Milwaukee visiting executives of the company.

♦ ♦ ♦

A. H. Zastrow has been elected

traffic manager of the A. O. Smith Corp., Milwaukee, succeeding the late George B. Hetherington. Mr. Zastrow became associated with the company several years ago, but more recently had been identified with the Western Weighing and Inspection bureau in Milwaukee.

♦ ♦ ♦

R. J. Eckstein has been made manager of the Cleveland office of Cutler-Hammer Inc., Milwaukee, manufacturer of electrical control apparatus, with headquarters at 1405 East Sixth street.

Mr. Eckstein became associated with Cutler-Hammer 25 years ago, starting at the Milwaukee plant in 1911, and working through practically every department before going to the Cleveland office. A major portion of his career has been devoted to the application of electric control

R. J. Eckstein

to motors in every phase of industry.

♦ ♦ ♦

R. J. Southwell, formerly associated with Wickwire Spencer Steel Co., New York, for many years, has been appointed sales engineer of the American Chain Co. Inc. and associated companies, Bridgeport, Conn.

♦ ♦ ♦

Robert A. Campbell, formerly associated with Steel & Tubes Inc., Cleveland, has been appointed western sales manager of the Standard Tube Co., Detroit, with headquarters at 919 North Michigan avenue, Chicago.

♦ ♦ ♦

R. E. W. Harrison, of Clarke-Harrison Inc., management engineers, Packard building, Philadelphia, is now also vice president of the Chambersburg Engineering Co., Chambersburg, Pa. He formerly was head of the machinery division of the

Robert S. Hammond

Who has been elected president of the Foundry Equipment Manufacturers association, as noted in STEEL for Feb. 17. He is vice president of the Whiting Corp., Harvey, Ill.

bureau of foreign and domestic commerce, Washington.

♦ ♦ ♦

L. T. Merwin has been elected president of the Northwestern Electric Co., Portland, Oreg., succeeding Paul B. McKee, resigned, who will retain the presidency of the Pacific Power & Light Co. Mr. Merwin, who formerly was vice president and general manager, has been with the company 24 years.

♦ ♦ ♦

Stephen F. Briggs, Briggs & Stratton Corp., Milwaukee, who recently acquired the controlling interest in the Johnson Motor Co., Waukegan, Ill., maker of outboard engines, has been elected president of that firm, to succeed H. G. Delabar. Joseph Rayniak, P. A. Tanner and E. H. Millet have been elected vice presidents, and C. P. Rossberg, secretary and treasurer.

Other directors are Joseph Otis, president of the Stewart-Warner Corp.; Eugene F. MacDonald, president of the Zenith Radio Corp., Chicago; and T. S. Murphy, of Hayden, Stone & Co., New York.

♦ ♦ ♦

Harry C. Ritter has been appointed district manager of sales in charge of the Chicago district of Bliss & Laughlin Inc., Harvey, Ill.

Prior to his affiliation with the department of sales of Bliss & Laughlin, Mr. Ritter was employed in the open-hearth department of the Railway Steel Spring Co., and also as a salesman for the Steel Sales Corp. In 1928 Mr. Ritter served as salesman for Bliss & Laughlin covering the southern Cook county territory, which was later extended to include the entire Calumet district and Joliet, Ill. In 1930 his territory was again extended to include Rockford, Belvidere, and Freeport, Ill.

♦ ♦ ♦

A. Cohen, Lynchburg Iron & Metal Co., Lynchburg, Va., has been elected president of the southern chapter of the Institute of Scrap Iron and Steel Inc. Other officers include P. Jaffe, Jaffe Wohl Iron & Metal Co., Birmingham, Ala., vice president, and A. L. Stein, Stein Metals Corp., Atlanta, Ga., secretary.

♦ ♦ ♦

William Taylor, formerly sales representative for Toledo Steel Products Co., Toledo, O., in Michigan, Ohio, Indiana and Illinois, has been made assistant sales manager of the company. Mr. Taylor's association with Toledo Steel Products during the past eight years has been marked by steady progress in the knowledge and understanding of

William Taylor

jobbers' problems and their relation to the manufacturer.

♦ ♦ ♦

H. F. Heineman, Wabash building, Pittsburgh, and Edgar D. Harder, National Bank building, Detroit, have been appointed representatives of the Yarnall-Waring Co., Philadelphia. Mr. Heineman will handle the sale of Yarway products in western Pennsylvania and West Virginia, and Mr. Harder will assist in the sale of Yarway lines in the Ohio-Michigan district.

♦ ♦ ♦

James Honan, assistant general manager, Dominion Oxygen Co. Ltd., Toronto, Ont., has been elected chairman of the Canadian section, Compressed Gas Manufacturers' Association Inc. He had previously served as vice-chairman representing the Toronto division.

Mr. Honan has been associated with Dominion Oxygen Co. Ltd. since

its organization 16 years ago, and has been connected with the oxyacetylene industry for 20 years. He has also been prominent in a number of Toronto civic and trade organizations.

♦ ♦ ♦

Harry B. Clapp has been appointed transportation engineer of the Clark Tructractor Co., Battle Creek, Mich., manufacturer of gas-powered industrial trucks, tructiers, and tractors. A native of Michigan, Mr. Clapp is an engineering graduate of the Colorado School of Mines, and his business career embraces production, cost analysis, and the elimination of nonproductive labor in manufacturing plants. He will make his headquarters at Battle Creek as special engineering assistant to Ezra W. Clark, vice president.

William Watts Rose

Elected executive vice president of the Gray Iron Founders' society, with offices in Cleveland, as reported in STEEL for Jan. 20. Prior to joining the society he was engaged in government work

Mr. Clapp's services will be at the disposal of manufacturing, railroad, and terminal interests seeking methods and means of lowering material and freight-handling costs.

♦ ♦ ♦

A. H. Renshaw, formerly vice president, General Railway Signal Co., New York, has been elected president and chairman of the board, succeeding the late W. W. Salmon, who was president and general manager. Sidney G. Johnson has been made vice president, succeeding Mr. Renshaw.

♦ ♦ ♦

R. J. Lamont, formerly vice president and general manager of Todd Seattle Dry Docks Inc., Seattle, has been elevated to the presidency, succeeding the late C. W. Wiley. Mr. Lamont will continue as general manager. He has been with the company since 1916, having had charge of the company's construction plant in Tacoma, Wash., which was closed in 1921.

J. D. Haynes, has been re-elected vice president of the Seattle plant, and O. M. Lund, secretary-treasurer, has been advanced to vice president and secretary.

♦ ♦ ♦

George P. Halliwell, formerly assistant professor of metallurgy, Carnegie Institute of Technology, Pittsburgh, has been appointed director of research, H. Kramer & Co., Chicago, refiner of nonferrous metal scrap, and producer of brass ingots and nonferrous alloys.

♦ ♦ ♦

Darwin Luntz, president of the Institute of Scrap Iron and Steel Inc., New York, has appointed the following executive committee of the institute, each member of which is chairman of a standing committee:

Ben Kaplan, of M. S. Kaplan Co., Chicago, chairman, welfare committee; Phil W. Frieder, of Philip W. Frieder Co., Cleveland, chairman, public relations committee; Herman D. Moskowitz, of Schiavone-Bonomo Corp., New York, chairman, finance committee; Joel Claster, of Luria Bros. & Co. Inc., Philadelphia, chairman, brokers' committee; L. J. Borinstein, of A. Borinstein, Indianapolis, chairman, legislative committee; Ben Cohen, of Louis Cohen & Son, Wilkes-Barre, Pa., chairman, yard dealers' committee; Edward L. Solomon, of Max Solomon Co., Pittsburgh, chairman, arbitration committee; David J. Joseph, of the David J. Joseph Co., Cincinnati, chairman, export committee.

J. O. LANGE

Made engineer of patents in new research and development division of Crane Co., Chicago. Graduate of Crane Technical high school and Junior college, with a degree in mechanical engineering, and a bachelor of law degree from John Marshall Law school, he entered employ of Crane Co. in 1918 as mechanical draftsman and later became mechanical engineer in industrial standardization. He is a member of the American Society of Mechanical Engineers, Western Society of Engineers and a number of other associations

W. J. Ross, of Hyman-Michaels Co., Chicago, will act as chairman of the executive committee without portfolio.

♦ ♦ ♦

Forrest E. Smith has been elected secretary of the Kensington Steel Co., Chicago. He will assume his new duties immediately.

♦ ♦ ♦

Engineering Foundation, 29 West Thirty-ninth street, New York, has named A. L. J. Queneau, metallurgist, United States Steel Corp.; Albert E. White, professor of metallurgical engineering, University of Michigan; Frederick M. Becket, vice president, Electro Metallurgical Co., New York; James T. Mackenzie, American Cast Iron Pipe Co., Birmingham, Ala.; John Johnston, United States Steel Corp., Kearny, N. J.; and Wilfred Sykes, Inland Steel Co., to its board.

Thomas J. McLoughlin

Who has been appointed assistant to W. S. Oberg, manager of operations for the Carnegie-Illinois Steel Corp. in the Pittsburgh district. He had been fuel engineer at the Duquesne works of Carnegie-Illinois since 1924

♦ ♦ ♦

R. D. Long has been made purchasing agent of the Chicago, Burlington & Quincy railroad, 547 West Jackson boulevard, Chicago, succeeding the late P. Hunter.

♦ ♦ ♦

Daniel W. Tomlinson, president, and all other major executives of the Metal Products Co., Batavia, N. Y., were re-elected at the annual meeting of directors of that company.

Editorial

New Steels Groomed for Transport Equipment Market

INTENSIFIED competition among materials is a healthy sign of improving business activity. Signs of such competition are evident to anyone who follows developments in new construction in recent months. Especially in the field of transport is this situation true. All-metal airplanes, new streamline trains, railroad cars, automobiles, trucks, buses—the list could be continued indefinitely—have set up new demands upon metal suppliers.

With the advent of structural aluminum alloys some years ago came the opportunity for sharply reducing dead load of structures, with a consequent increase in the amount of pay load possible. In the field of transport this meant a dollars and cents advantage that could not be overlooked. Hence the construction of aluminum truck bodies, aluminum bridge floors, gondola cars, streamline trains, and many other forms.

Quick to sense this competitive situation, producers of the various types of structural steels realized the need for some means of reducing dead weight or tare weight in steel assemblies. The natural step was to increase strength of the steel so that reduced sections could be employed. How to increase strength? Alloys naturally supplied the answer.

Compromise by Developing Analyses Between High Alloy and Carbon Steels

But here the matter of costs entered the picture. It would be of no value to develop an alloy structural steel which would boost costs seven or eight times over that for plain carbon steel. Of course, the 18-8 chrome-nickel stainless steel, with high strength and cost inherent, was adopted in many installations where its economy could be justified. But for widespread applications some other less costly form of high-strength steel was demanded.

Compromising between the high-alloy type and the plain carbon steel, producers evolved the so-called low-alloy high-tensile steels, now available commercially from a number of steel companies and under various trade names. Low carbon content, combined with small amounts of various alloying elements—copper, chromium, nickel, manganese, silicon—produces *yield* strengths of the order of 55,000 to 75,000 pounds per square inch, as well as good welding and forming characteristics and mild corrosion resistance.

High yield strength is the factor which gives these steels their important structural qualities, rather than high tensile strength, since stiffness is essential if the size of section is to be reduced. In general, it is believed that weight reductions of about one-third are possible by using the low-alloy steels.

Once the favorable qualities of the low-alloy steels became known, demand for them leaped and naturally producers hastened to develop proprietary analyses. The list is growing and there appear to be widespread differences of opinion as to the exact analysis which will accomplish the most.

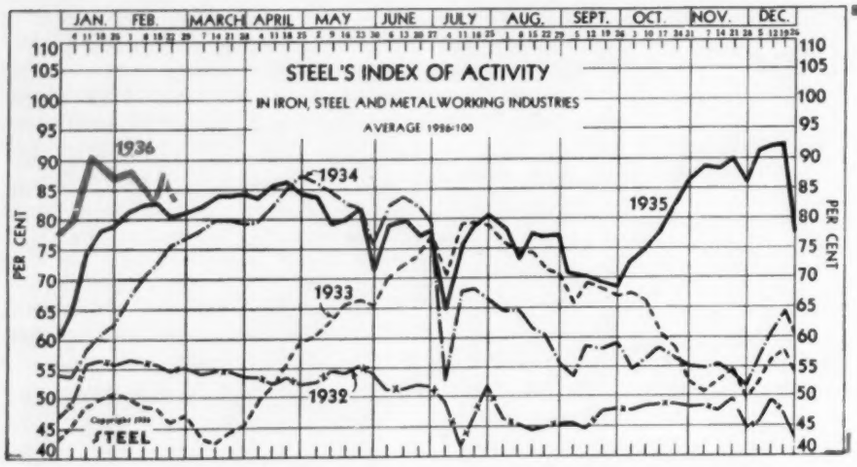
Generic Term Would Clarify Position Of Various New Steels for Consumers

To clarify many of the existing claims for these steels, it undoubtedly would be an excellent plan for some central authority, such as the American Society for Testing Materials, to undertake a study of these steels, and to make their findings common property. This was suggested at a recent symposium on metals in transportation at the New York meeting of the American Institute of Mining and Metallurgical Engineers, where Dr. H. W. Gillett presented a comprehensive review of what he and others prefer to call the low-alloy high yield strength structural steels.

In this connection it seems that another worthwhile move might be to decide upon some suitable generic term to identify this class of steels. They are definitely not carbon steels, and it is doubtful whether they would fall into the accepted classification of alloy steels, although there is much doubt as to just what are the limits implied by the term "alloy steels." The term "high-yield" and "high-elastic" steels have been suggested, but these descriptions are not entirely adequate. "Low-alloy" or "low-alloy high-tensile" have been other names applied.

Of all these identifying terms, "low-alloy" seems to have become the best established among metallurgists and engineers, and while the term might include many other steels not strictly in the structural classification, if the various producers would co-operatively agree on this identification, it would be possible to establish among consumers a definite consciousness of this type of material. Such a move might be of valuable assistance in offsetting any confusion resulting from the ever-increasing list of trade names identifying this type of material.

THE BUSINESS TREND



STEEL's *index of activity in the iron, steel and metalworking industries declined* 3.8 *points to* 82.1 *in the week ending Feb.* 22:

Week ending	1935	1934	1933	1932
Dec. 21	91.9	64.4	58.0	46.9
Dec. 28	77.3	60.8	53.7	42.3
	1936	1935	1934	1933
Jan. 4	78.2	65.4	53.6	45.3
Jan. 11	90.2	73.8	58.1	48.6
Jan. 18	89.3	78.1	60.9	49.8
Jan. 25	86.0	79.5	62.3	50.8
Feb. 1	86.5	81.8	66.9	49.9
Feb. 8	83.8	82.7	70.7	48.7
Feb. 15	85.9†	82.8	72.4	48.3
Feb. 22	82.1*	80.5	75.5	46.0

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL). *Average for* 1926 *equals* 100, *weighted as follows: Steel rate* 40, *and car loadings, power output and auto assemblies each* 20.

Marked Gain in Activity in March Seems Assured

ALTHOUGH the lead of 1936 industrial activity over that of a year ago has been diminishing in recent weeks, the current figures still hold a narrow margin. STEEL's index for the week ending Feb. 22 stands at 82.1, as against 80.5 in the corresponding week of 1935.

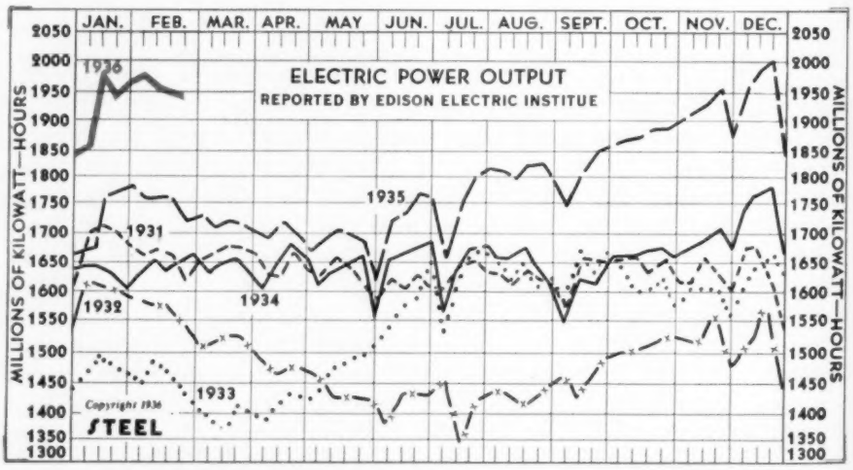
The slight advantage is held by virtue of a relatively strong situation in revenue freight traffic, electric power output and steelworks operations, and in spite of a low rate of automobile production. Currently freight car loadings are running about 8 per cent ahead of last year's level. Power output is up more than 12 per cent. Steelworks operations are about 9 per cent higher. However, motor car assemblies are lagging about 25 per cent behind, and it is this sector that will exert a strong influence upon the trend of activity in industry generally throughout the next few weeks.

Automobile output is believed to be close to the low point of its present cycle. When schedules begin to expand, as they will in the nearby future, the increasing support of fresh automobile activity will be heaped upon the already substantial improvement in the capital goods industries.

This means that the outlook for March is reassuring. The curve of activity which now seems to be dangerously close to the 1935 line, will swing upward—possibly to the extent that the first quarter of 1936 will average out very favorably in comparison with the best previous three-month periods of the recovery era.

Millions Kw.-Hrs.

	1936	1935	1934	1933
Feb 22	1941	1728	1646	1425
Feb. 15	1950	1760	1641	1469
Feb. 8	1952	1763	1652	1482
Feb. 1	1962	1762	1636	1454
Jan. 25	1955	1781	1611	1469
Jan. 18	1949	1778	1625	1484
Jan. 11	1970	1772	1646	1495
Jan. 4	1854	1668	1564	1461
	1935	1934	1933	1932
Dec. 28	1847	1650	1539	1415
Dec. 21	2002	1788	1657	1554
Dec. 14	1983	1767	1644	1563
Dec. 7	1970	1743	1619	1519
Nov. 30	1877	1684	1554	1510
Nov. 23	1953	1705	1608	1475



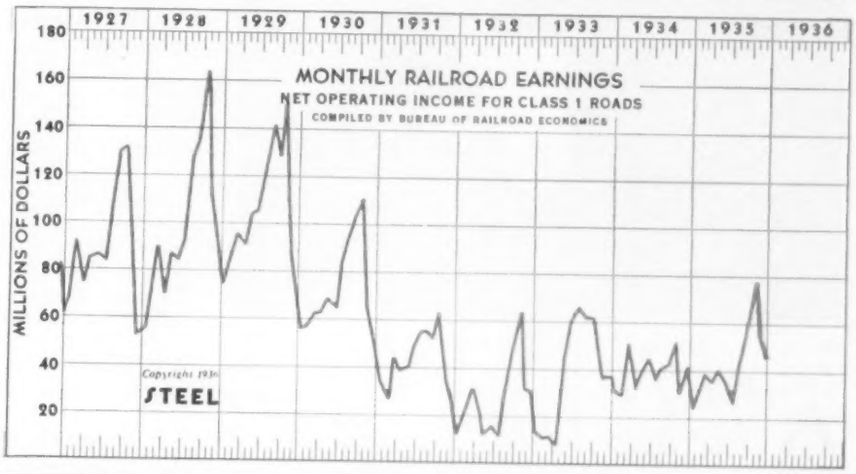
Building Construction Declines Sharply in January

	Square Feet		
	1936	1935	1934
Jan.	27,053,300	11,245,100	9,568,700
Feb.	.....	9,670,300	8,176,300
Mar.	.....	15,873,100	14,788,900
Apr.	.....	19,981,100	14,207,100
May	.....	22,276,200	14,664,400
June	.....	22,878,800	13,986,500
July	.....	21,565,900	13,250,000
Aug.	.....	21,545,400	14,259,000
Sept.	.....	21,365,700	12,510,300
Oct.	.....	27,775,900	15,098,100
Nov.	.....	24,120,700	12,780,800
Dec.	.....	33,441,900	9,188,700

1927 1928 1929 1930 1931 1932 1933 1934 1935 1936
BUILDING CONSTRUCTION
CONTRACT AWARDS IN 37 STATES
COMPILED BY F. W. DODGE CORP.
MILLIONS OF SQUARE FEET
100 90 80 70 60 50 40 30 20 10
Copyright 1936
STEEL

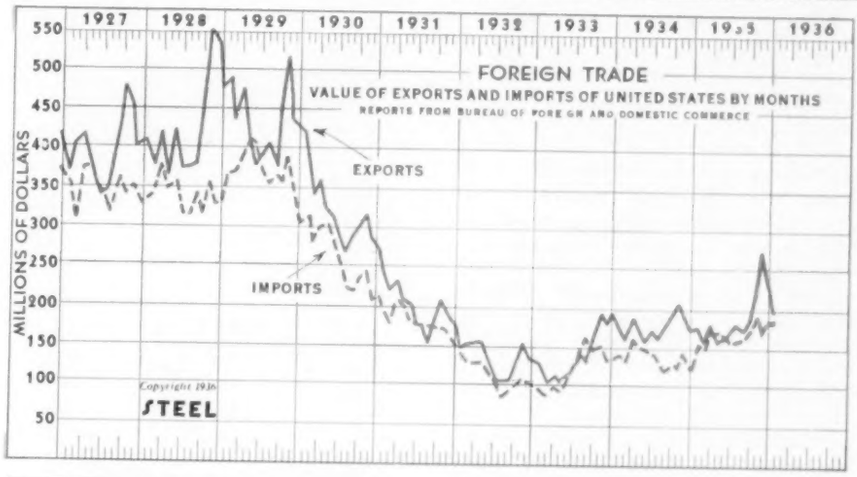
Railroads Earn 1.93 Per Cent On Investment in 1935

	1935	1934	1933
Jan.	$21,348,557	$31,058,275	$13,585,011
Feb.	25,719,919	29,420,772	10,133,779
March	37,850,965	52,217,083	10,805,518
April	34,625,786	32,433,939	19,351,463
May	39,505,069	39,699,194	41,042,629
June	34,024,691	42,037,757	59,831,292
July	26,851,397	35,441,265	64,752,602
Aug.	42,074,108	40,564,071	61,401,984
Sept.	57,359,339	41,713,425	60,608,882
Oct.	75,425,092	49,336,307	57,366,046
Nov.	54,234,305	32,540,502	37,662,122
Dec.	46,040,165	38,738,295	37,726,341


1927 1928 1929 1930 1931 1932 1933 1934 1935 1936
MONTHLY RAILROAD EARNINGS
NET OPERATING INCOME FOR CLASS 1 ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MILLIONS OF DOLLARS
180 160 140 120 100 80 60 40 20
Copyright 1936
STEEL

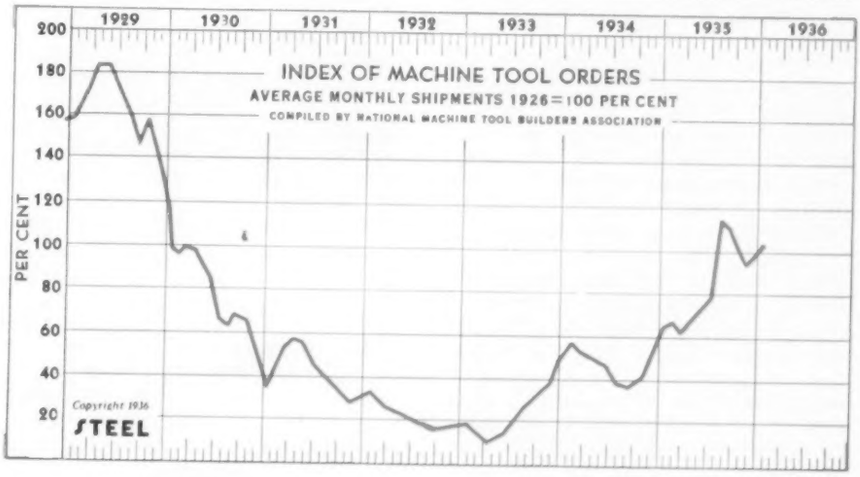
Trade Balance Dwindles as January Exports Decline

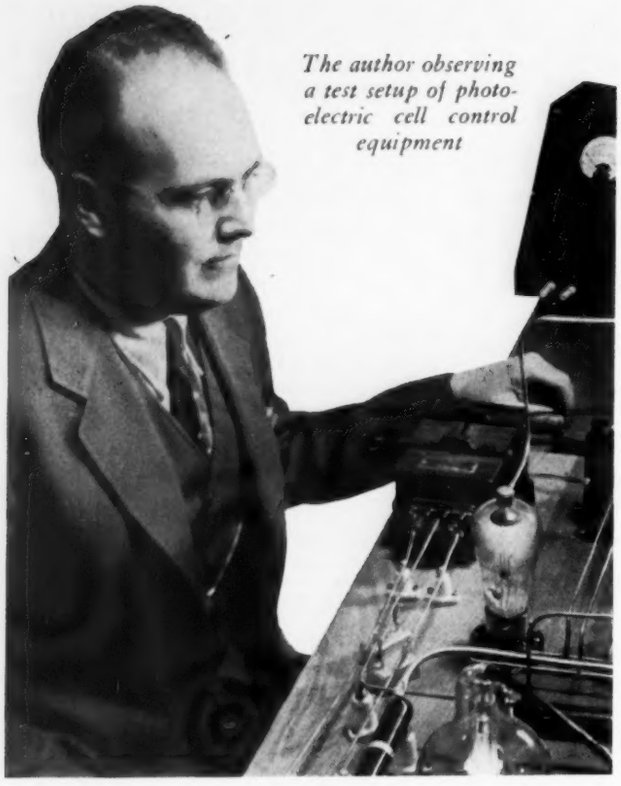
	Dollars (000 omitted)			
	1936		1935	
	Exports	Imports	Exports	Imports
Jan.	198,436	186,915	176,223	166,993
Feb.	.....	.....	163,006	152,537
Mar.	.....	.....	185,603	177,279
Apr.	.....	.....	164,350	170,567
May	.....	.....	165,457	170,207
June	.....	.....	170,193	156,756
July	.....	.....	173,371	177,698
Aug.	.....	.....	172,194	169,030
Sept.	.....	.....	198,189	161,653
Oct.	.....	.....	221,215	189,240
Nov.	.....	.....	269,400	168,955
Dec.	.....	.....	223,737	186,648


1927 1928 1929 1930 1931 1932 1933 1934 1935 1936
FOREIGN TRADE
VALUE OF EXPORTS AND IMPORTS OF UNITED STATES BY MONTHS
REPORTS FROM BUREAU OF FOREIGN AND DOMESTIC COMMERCE
MILLIONS OF DOLLARS
550 500 450 400 350 300 250 200 150 100 50
EXPORTS
IMPORTS
Copyright 1936
STEEL

January Machine Tool Orders Show Continued Gain

	1936	1935	1934	1933
Jan.	102.6	61.3	56.5	18.3
Feb.	.....	61.5	58.2	15.2
March	.....	60.3	50.9	11.1
April	.....	60.3	48.5	8.3
May	.....	67.1	46.8	10.6
June	.....	76.7	42.6	15.5
July	.....	94.7	38.6	22.4
Aug.	.....	112.2	37.1	27.9
Sept.	.....	108.5	37.4	30.9
Oct.	.....	102.9	40.5	33.3
Nov.	.....	93.8	44.2	38.0
Dec.	.....	99.9	54.1	51.0


1929 1930 1931 1932 1933 1934 1935 1936
INDEX OF MACHINE TOOL ORDERS
AVERAGE MONTHLY SHIPMENTS 1926=100 PER CENT
COMPILED BY NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
PER CENT
200 180 160 140 120 100 80 60 40 20
Copyright 1936
STEEL



The author observing a test setup of photoelectric cell control equipment

Use of "Electric

BY R. A. POWERS
Chief Physicist,
Electronic Control Corp., Detroit

ALTHOUGH the photoelectric cell or, as it is more commonly called, the "electric eye," is used extensively in industry to replace inspection duties of the human eye, nevertheless, few laymen appreciate the necessary engineering of optical systems and associated equipment to have the "electric eye" successfully simulate the human eye and the resulting action of the inspection. Even fewer persons appreciate that the photoelectric cell is over 50 years old; it was not until sound pictures came to the theaters of the United States that commercially reliable photoelectric cells were developed. In the theaters, almost overnight there was a demand for commercial photocells, for translating the small light impulses registered on edges of film into electrical energy, which could be amplified, and in turn, through the speakers, be reproduced as sound.

Generally speaking, today there are three different classifications of photoelectric cells. In the photovoltaic group are the light sensitive cells which produce their own voltage and their own current when illuminated. Some of the cells in this classification will produce as much as 20 milliamperes when placed in the direct sunlight, but because of the low internal resistance of this type of cell, the output is not easily amplified by the vacuum tube and, therefore, a sensitive relay of the galvanometer type is essential. This type of cell is being used successfully in measuring light intensities such as the illumination in homes or offices.

The second group of photocells is commonly termed the photoconductive group. These cells usually are very sensitive, and operate much in the manner of a variable resistance. When light is applied to the sensitive area, the resistance of the cell decreases, but in all these cells there is always present dark current, or dark resistance, even though the cell may be in complete darkness. Usually this classification of cell is more or less unstable, and therefore, is not used commonly in industry.

Can Control Temperature

The third group of cells is known as the photoemissive type. In this type of cell there is an emissive or sensitive area known as the cathode. The cathode emits electrons freely when illuminated. These electrons are collected by an anode, and as a result the cell passes current. While this current is small—in the order of a few microamperes—because of the high impedance of the cell, this current is readily amplified by an ordinary radio receiving tube, or industial tube.

Because this type of photocell can be easily coupled, or connected, to an ordinary vacuum tube amplifier, it lends itself to multistage amplification where great sensitivity is desired. Some idea of its sensitivity can be appreciated from the fact that when it is connected to a suitable and correctly designed amplifier, light intensity of stars in the four-teenth magnitude can be measured readily.

Since this cell responds to that part of the spectrum beyond the range of the human eye, it is well suited for controlling the temperatures through infra-red radiation, which is accurate and rapid.

In generally considering the photoelectric cell, or electric eye, and the resulting actions to be accomplished by its use, we must consider the electric eye itself as but one cell of the human eye. As a result, for simulation of those problems or jobs accomplished by the human eye, optical systems must be used with "electric eye." In almost all types of photoelectric installations, one may compare the amplifier itself to the brain, and the relay, solenoids, air valves or other operating mechanism to the arms or other parts of the human body, with which it is necessary to do the sorting, grading and other work involved in inspection. The design of the circuit, the wiring of the amplifier, may be compared to the education of the brain.

Considering this, it is impossible to expect the inexpensive light relays, now obtainable on the market, to do the more careful and more tedious jobs of inspecting to 0.0001-inch, of grading colors, of sizing articles, of inspecting articles for missing labels, or detecting small pinholes. In all these more complicated types of inspection problems, it is not only the "electric eye" itself, but the amplifier and the associated optical system before the

Eye" in Industrial Process Control

"electric eye," as well as actuating mechanism, which give the desired action.

One of the more recent installations of the photocell is for controlling the temperature in a resistance-type heater, used for hardening or heat treating the tips of valve stems. The use of a standard light relay for this type of installation would be impossible, because of the necessary amount of change in light intensity to close or open the relay. In the machine shown in an accompanying illustration, the tip of the valve is held between two dies which are the secondary electrodes of a low-voltage, high-amperage transformer. The operator of the device merely trips the foot button, which automatically grips the valve between the two dies. The heating current is turned on 0.1-second after the dies have located the work. Only about 0.75-second is required to bring the valve stem from room temperature to around 1700 degrees Fahr.

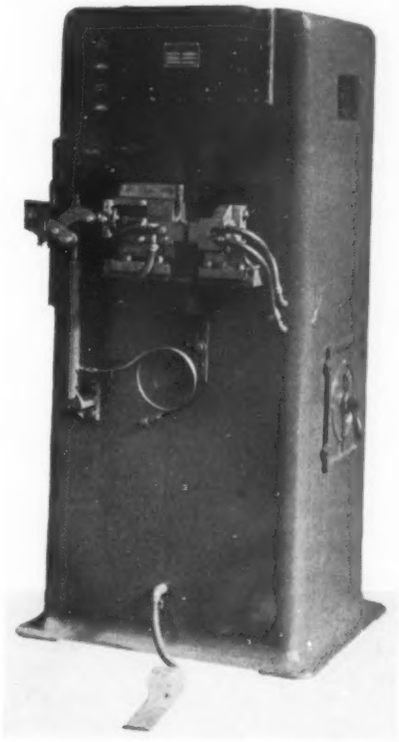
Rapid Response Necessary

The photoelectric cell first turns off the heating current at the correct temperature, and, through the electronic time delay previously mentioned, allows the dies, or jaws, to open 0.1-second later, dropping the valve into the quenching tank.

To insure this speed, it is necessary to have a photoelectric unit which will respond to minute changes in light intensity; it must be rapid and, furthermore, for accuracy, it must not be affected by solar changes. By solar changes is meant the changes which occure in extraneous light values between night and day. The photoelectric unit for temperature control must have a self-contained voltage regulator so that in the event the 110-volt lighting line which supplies the photoelectric unit drops as low as 95 volts or rises as high as 125 volts, the temperature constant of the output of the photoelectric unit must be the same. The 0.1-second delay mentioned in the opening and closing of the dies is important, in order to eliminate any burning of the valve stem due to arcing. The entire photoelectric temperature control shown in this illustration maintains a constant control of the heating to within plus or minus 2 degrees of the established limit.

Today this same type of photoelectric temperature control is used in checking the temperature of ring gears as they are removed from the carburizing pots before they are quenched; and in checking the temperature of steel slugs before they are placed in upsetters for making valves.

Photoelectric temperature control records or indicates accurately the temperature of the heated article and not of the furnace or heating element; and its speed is greater than other types of control. Today, suitable photoelectric temperature control units are obtainable which will control or indicate established temperatures to below 900 degrees Fahr., and as high as incandescence, and maintain limits within plus or minus a few degrees of the desired limit.



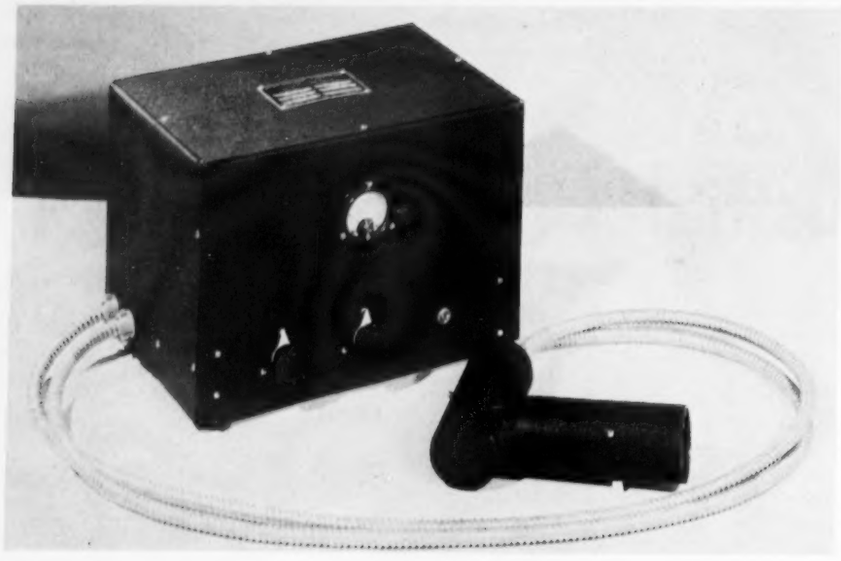
Valve tip heat treating machine, equipped with photoelectric cell which automatically turns off heating current at the proper moment and 0.1-second later releases the heated valve which then falls into a quench tank

While photoelectric cells and associated equipment are being used extensively for grading, sorting, measuring and inspecting, one of the more recent installations of the electric eye is interesting. In the past the scleroscope for determining the hardness of steel surfaces has been dependent upon the human eye to make the reading, or determine the maximum bounce of the hammer. Many times, after days of work, the human eye fatigues on this type of job. Recently an electric eye, or photoelectric cell, was installed to check the actual height of the bouncing hammer in the scleroscope.

May Be Made Automatic

Because of the small size of the hammer, and the speed with which it traveled, it was necessary in this installation that a fairly high grade optical system be designed and used, so that a small ribbon of light be projected across the glass tube of the scleroscope. This small ribbon of light, after it passes through the tube of the scleroscope, reaches a cylindrical lens so that the small ribbon of light is magnified to cover the entire sensitive area of the photoelectric cell. As a result, a small movement of the hammer into this ribbon of light causes a total eclipse of the photoelectric cell, and a rapid correct determination of the actual height of the bounce of the hammer. The interception of this ribbon of light by the hammer of the scleroscope may either turn on a pilot lamp or cause automatic passing of the articles meeting the required hardness.

In almost every branch of industry there has been an increasing demand for accurate, rapid sorting



Photoelectric temperature control unit for the range 900-3000 degrees Fahr., with accuracy to plus or minus 1 degree. Cell is in the tubular housing, which is equipped with lenses and filters so that an image of the heated object is projected to the cathode of the cell

and grading of finished products. In many parts, this accuracy has approached the grading to five different sizes 0.0001-inch apart. The frictional contact of an ordinary indicator, or other type of gage, rapidly wears. Where speed is necessary, constant attention to these gages is required. The reasonable answer to this problem is to measure with light, because light offers no friction to the object being measured. But when 0.0001-inch must be magnified to 0.1-inch for ease of visible recording of the differences in sizes, the magnification is in the order of 1000 to 1 and light falls off in intensity approximately by the square of the magnification in addition to the losses in the optical system. Yet, in measuring to 0.0001-inch, the amount of light used to project the image of the measured article through the magnifying optical system cannot be so intense that the heat radiated from the light will cause expansion of the article being measured.

Distinguishes Low Intensities

The accompanying sketch illustrates a suitable optical system. The amount of light naturally must be at what might be termed a low level. As a result, the difference in the shadow and light portions as projected by the objective optical system of the surface of the measured article will not be discernible to the human eye. Because the photoelectric cell and associated equipment will respond readily to lower intensities of light than the human eye, the photocell again becomes the solution to the problem of measuring accurately and rapidly by means of a beam of light.

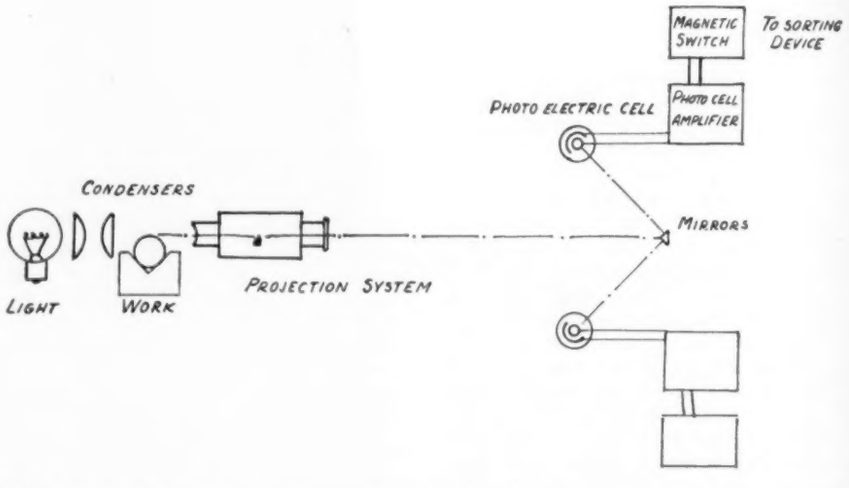
While the photoelectric cell has probably received more publicity than any of the other tubes in the electron family, the industrial applications of the tubes commonly called radio amplifying tubes are numerous. In the analysis of chemical solutions to find a definite end point at which an acid solution becomes neutralized, and before it passes into a basic or alkaline solution, there is probably no better method than using a vacuum tube amplifier. The input of the amplifier is connected to a calomel cell, and as the acid in this cell is greatly reduced by the addition of an alkaline reagent, each drop, or each amount of alkalizing or neutralizing solution, is recorded and the corresponding output of the amplifier also is recorded. As a result, a definite end point is established where the solution in the cell becomes neutralized and before it passes into the alkaline state.

In producing an amplifier for this type of small current and voltage measurement, the amplifier must be so designed that it will not disturb the output reading because of internal battery fatigue, vacuum tube fatigue or other natural drifts which are caused and experienced in almost all types of electronic equipment. To make the amplifier constant, not only has the circuit to be designed correctly to insure stable output readings regardless of the supplying battery voltage, but also it is essential that the parts in this amplifier will not be affected by moisture, humidity or temperature changes.

Records Actual Noise Level

Under the category of amplifiers, is the mechanical, or electrical ear, used in determining the actual noise level, or sound output of various types of roller and ball bearings on the final inspection lines of manufacturers. While this type of problem might appear to be easily accomplished by the average reader, it must be taken into consideration that in many cases the actual sound output of the bearings may appear to be annoying to the human ear, and yet the ordinary electrical, or mechanical ear, will record this detrimental sound only at its existing output level. As a result it will not show its detrimental affect upon the finished product.

In practice it has been the basic opinion that the human ear responds at its maximum in the neighborhood of 1000 cycles per second, and as a result almost all amplifiers used for the inspection and measurement of noise or sound output of various mechanical devices have been made to have their maximum output at 1000 cycles. In analysis, however, it has been found that there are frequencies as high as 8500 cycles be-



Sketch of optical system for automatic photoelectric inspection or sizing. Increase in size of the object by 0.0001-inch is magnified to 0.1-inch at the mirrors

yond the response of the human ear, which produce overtones or heterodynes with lower frequencies of less amplitudes and cause an annoying or heterodyne noise commonly referred to as a rumble. Therefore, actually to simulate the conditions of the human ear in a testing for these various noise levels, the amplifier must respond to frequencies from 16 cycles to 9000 cycles.

Adapted to Plant Practice

A good example of this type of installation is that of inspecting roller bearings in manufacturing plants supplying the automobile and allied industries. Various types of electrical or mechanical ears have been installed which actually read in decibels the output sound, or noise level, of the bearing under test. A standard bearing is used as a maximum noise level, which is acceptable to this division of the inspection department. The bearings after being closely noted on the sound equipment, are passed as being O.K., and yet a final inspection in a soundproof room will reveal that many bearings passed as perfect have an extremely high whistle, or shrill note, barely perceptible to the human ear. This high note, or high pitched whistle, when coupled with the balance of the mechanical equipment into which it is placed, will produce a heterodyne disturbing to the human ear. Therefore, sound measuring equipment to be used for bearing manufacturing must be designed exclusively for this type of business.

One cannot expect to test bearings on units that are commonly used to measure the noises of various downtown streets. An accompanying illustration shows sound level equipment used by some of the bearing manufacturers today, which will respond to both high and low frequencies.

A complete technical description of all the more recent adaptations of electron tubes would be impossible in this space. However, the few installations described here should stimulate the engineer's imagination into visualizing how electron tubes can help solve his problems.

In production inspection, grading and sorting where the human sense of sight, touch, or hearing are used, electron tubes now will accomplish the same work more quickly and more accurately.

Book on Coating Practice Now in Second Edition

Galvanizing, by Heinz Bablik; cloth, 367 pages, 4 x 6½; published by E. & F. N. Spon Ltd., London; supplied by STEEL, Cleveland, for $8, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Few books dealing with the galvanizing process are available in the English language. The translation of the second edition of Mr. Bablick's book therefore, will satisfy a long-felt requirement of the coating industry in this country.

Hot galvanizing is discussed by the author under three headings, namely, pickling, flux and galvanizing. He considers pickling an important step in the process and presents considerable data on scale and rust layers; pickling reactions, flaws, blisters and additions; setting up of baths; and, pickling equipment including tanks, baskets, and machines of various types. Under flux, the author deals with its function, composition, reaction and quality.

Study of the space lattice structure and its influence is developed under the heading of galvanizing. The history of the formation of hot galvanizing coatings has assisted the author in explaining the structural make-up of galvanizing. After dealing with the influence and types of zinc, iron, cadmium, zinc oxide, electrolytic zinc, aluminum and other admixtures, he discusses in considerable detail the properties of a hot galvanized coating, its flexibility and adhesive strength, and equipment. About 55 pages deal exclusively to the galvanizing process itself.

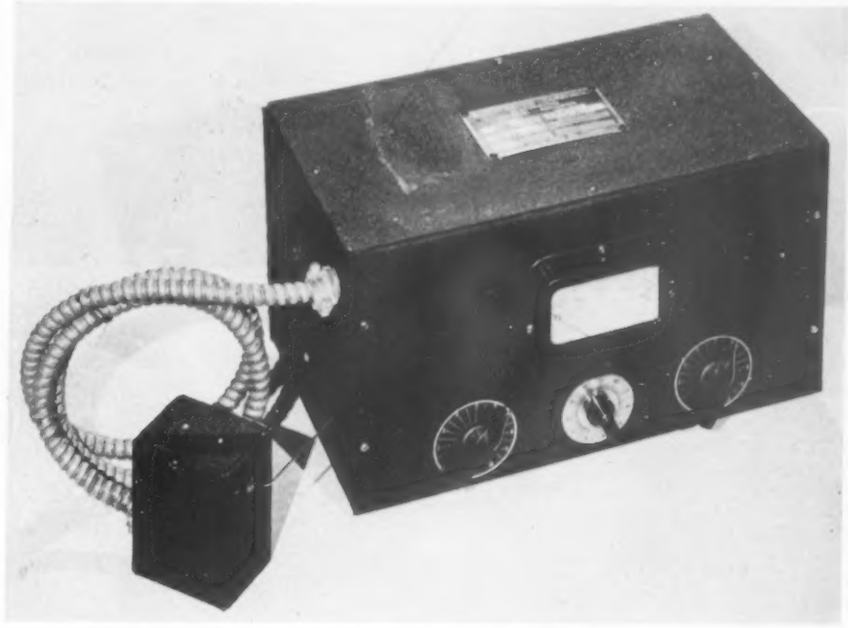
Then follows a treatise on electrogalvanizing, sherardizing and spraying, the author reserving the closure for a detailed discussion on testing and judging of galvanized coatings.

A bibliography includes 209 references to literature dealing with galvanizing practice. The text is accompanied by 226 illustrations and 113 tables.

The book should command the interest of those engaged in the galvanizing industry for the author offers the galvanizer practical technical knowledge that will be a sure guide to the correct or most satisfactory method of working under any possible conditions.

Fan Blade Tip Reduces Noise Caused by Air Whip

Noise caused air whip has been reduced by a new semi-trough shaped tip for blades of large circulating fans being introduced by Robbins & Myers Inc., Springfield, O. The tip has an effect similar to that of the venturi ring on exhaust fans. Four models—floor, wall, ceiling and bench—in 20, 24, and 26-inch sizes are furnished.



Amplifier and pickup stylus used for inspecting sound level of roller bearings. Control at the right permits compensating for vibration of the testing fixture. The Piezo electric vibration pickup is housed in the small black container completely supported in sponge rubber

A stylist has redesigned the R. & M. 10-inch oscillating fan and engineers have designed a new-type blade. This fan is finished in glossy black and silver bronze, with bright plated guard.

All-metal construction is employed in a portable, 8-inch exhaust fan for use in homes. The adjustable range of the panel on which the fan is mounted makes feasible its operation in windows and partitions. Reinforced cast iron is used in the frame of a heavy-duty exhaust fan for industrial plants, restaurants, and the like.

Pontiac Radiator Grille Stamped and Formed in One Piece from Strip Steel

DISTINCTIVE radiator grille design used on Pontiac motor cars also is a distinctive manufacturing operation. Special press equipment and dies are required to produce the latticed front with its graceful curve.

Fourteen separate manufacturing operations, with a rather large number of suboperations, such as the many phases of metal finishing and polishing, are required to turn out the completed grille.

Automatic Press Stamps Pattern

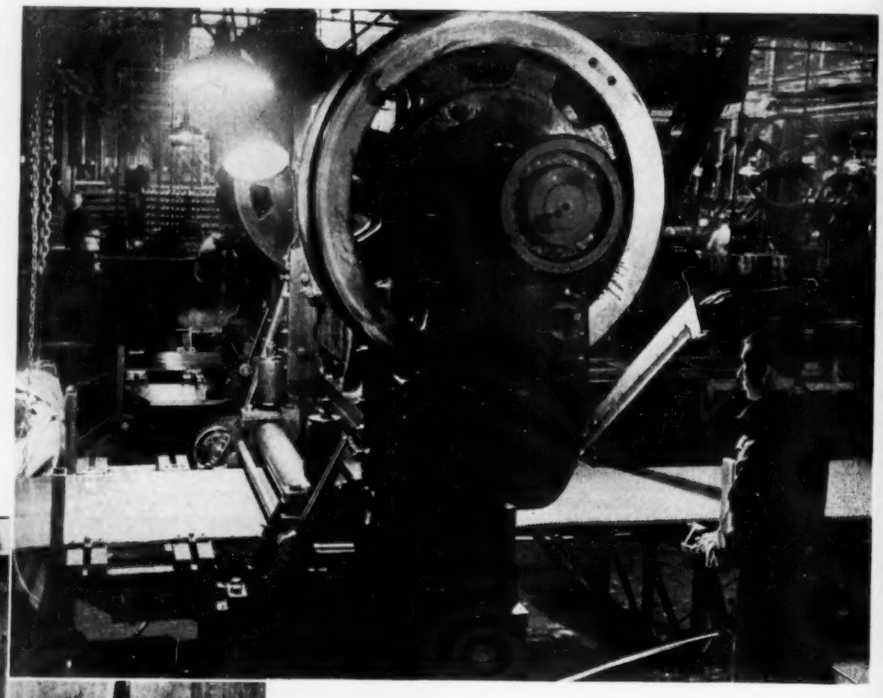
Blank stock comes to the press room in the form of large rolls of strip steel 47⅛ inches wide and about the size of the rolls of paper used to print a city newspaper. This strip is fed through the first press which is automatic in operation. Here the pattern and design of the grille is stamped into the metal. The operator cuts off stamped strips in workable lengths of about 8 feet.

Following this forming operation the large sheets are cut into proper widths, the flanges flattened, ends trimmed and flanges bent. These are all separate operations. Then the V-form or surface curve is given the grilles and they are notched for fastening.

Next is the most interesting and probably the most intricate metal pressing and die operation in the entire Pontiac sheet metal plant. Five bending and restriking operations are performed in one press. They are, in order: Bending the top for the curve over the top of the radiator; bending the bottom, and three restriking operations which give the finishing touches to the contour of the grille.

So intricate are these bending operations that the clamps which hold the grilles in place in the dies must be released and opened before the dies can be raised and withdrawn; otherwise they would be damaged.

After these five press operations there follows the trimming of top



ABOVE is shown the first operation in forming the "silver streak" grille, strip steel 47⅛ inches wide being fed through an automatic press which stamps the pattern of the grille. At the left an operator is shearing the formed strip into workable lengths of about 8 feet as it emerges from the press

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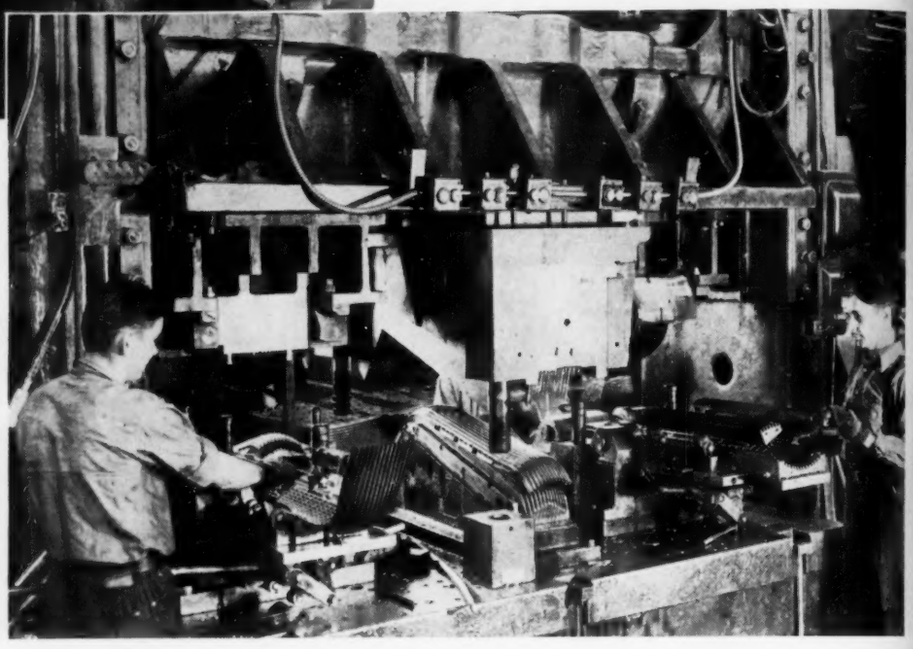
FIVE operations are performed on the grille in this press (below). The flat grilles are clamped in position at the extreme right while the top is bent; then, in dies at the left foreground the lower portion is bent. The three other operations involve restriking or final shaping before finishing and final assembly



IN THE illustration above an operator is cutting the 8-foot lengths of formed strip into correct sizes for subsequent bending trimming, punching and forming operations required in finishing the grille

and bottom; restriking the top; notching out the crankshaft hole; piercing the fastener holes and then finishing and polishing. The grilles are next assembled with the radiator shell and side grilles, following which they are conveyed to a subassembly line for installation in the chassis.

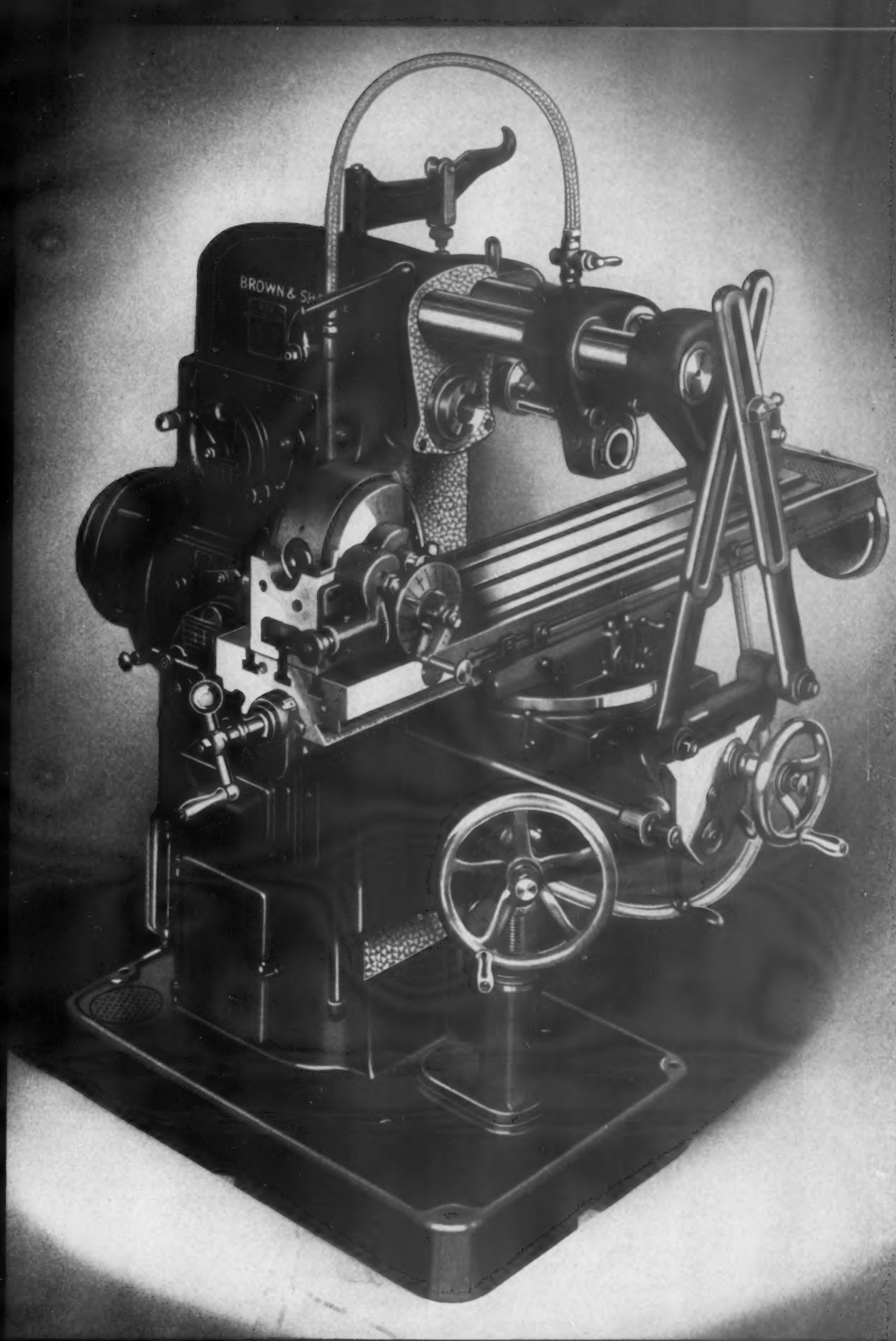
Illustrations on this page and on page 44 show a number of the operations outlined above.

Melting Costs Compared

Comparison of metal melting costs in crucible furnaces, open flame furnaces, electric indirect arc furnaces and electric vertical ring furnaces are reviewed in a recently published 16-page booklet issued by Campbell-Hausfeld Co., Harrison, O., and available upon request. The discussion is an abstract of a recent study by R. H. Stone.

FINISHED grilles, after being assembled with the radiator shell. Following painting they are taken by conveyor to the sheet metal subassembly line

STEADILY GROWING in POPULARITY



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B·S

Reviews Safe Practices for Welding and Cutting In Unventilated Places

BY H. F. REINHARD
Union Carbide & Carbon Corp., New York, and
Secretary, International Acetylene Association

THE object of this discussion is to set forth the proper precautions and safe practices to be observed when welding, flame cutting and performing work involving flame or high temperatures in tanks or confined spaces; to detail and comment on some actual happenings that involved or should have involved said precautions and safe practices; and to review other factors pertaining thereto.

To guard against possible injury by explosion or fire, it is of course essential that any flammable vapors, liquids or solids be removed from a container before welding or cutting operations are commenced, or in fact before commencing any type of hot work or any operation that might create a spark or flame.

There is one good general procedure that has much merit and which should be used wherever conditions permit after cleansing a used container. The procedure involves simply filling the container with water as far as work permits, thus leaving as little space as possible in which explosive vapors might collect or be generated.

It is recommended that the inert gas method be used in all cases where the tank need not be entered and the repairs can be made from the outside, even when the containers have been treated with steam or hot chemical solution previously. The presence of inert gas in sufficient quantity will prevent ignition or explosion of vapors driven out of seams and joints by the application of heat and not removed completely by steam or chemicals. Note carefully that the inert gas is to supplement rather than supplant other treatment.

Permissible inert gases include carbon dioxide and nitrogen. When carbon dioxide is used, a sufficient amount should be introduced to produce a concentration of not less than 50 per cent by volume. This will usually require the introduction of a volume of carbon dioxide at least as great as the volume of gas space in the container. When the carbon dioxide content is not less than 50 per cent any mixture, regardless of ratio of flammable vapor to air, will be nonflammable and nonexplosive, unless the flammable vapor is principally hydrogen or carbon monoxide in which case a minimum of 80 per cent carbon dioxide content is required. Carbon dioxide can be used either as a gas compressed into cylinders or as solidified carbon dioxide, commonly called "dry ice." One pound of carbon dioxide is the equivalent of about 8½ cubic feet of carbon dioxide gas.

Testing the Atmosphere

There are on the market several well known makes of combustible gas indicators and detectors which will show safely and quickly whether dangerous concentrations of combustible gases or vapors are present. The most widely used and probably most accurate detector is the hot-wire type using a heated filament in a wheatstone bridge or potentiometer circuit. These generally give readings directly in per cent of the amount necessary to reach the lower limit of the explosive range. At least one of this type of detector incorporates a safety lamp for the determination of oxygen deficiency, and has a method for testing for dangerous concentrations of carbon monoxide and hydrogen sulphide.

Even though a tank or confined space does not contain or has not held flammable liquids or vapors, it is essential that certain precautions be taken.

Good practice always requires that a closely confined space be ventilated or that workmen therein be supplied with proper masks or respirators. One good ventilation method extensively used is to lead an air hose into the confined space and direct the flow of air under low pressure onto the face and chest of the operator. This not only insures a supply of fresh air to the operator but it circulates the air in the space and it cools the operator. In shops air under pressure is usually available. Where it is not, and in field work, cylinder air, not oxygen, or a manually operated air pump can be used.

Where a confined space has at least two openings, a good method of keeping proper circulation and replacement of air is to place an exhaust fan in one of the openings. Where an exhaust fan cannot be used or is not available an air jet arranged so as to blow out of one of the openings or through a length of pipe placed in one of the openings, will exhaust the air on the injector principle providing circulation, and causing outside air to be sucked in through the other opening or openings.

Where for one reason or another

Condensed from a paper presented recently by Mr. Reinhard before the chemical section of the National Safety council at the National Safety Congress in Louisville, Ky.

ACCURATE RODS

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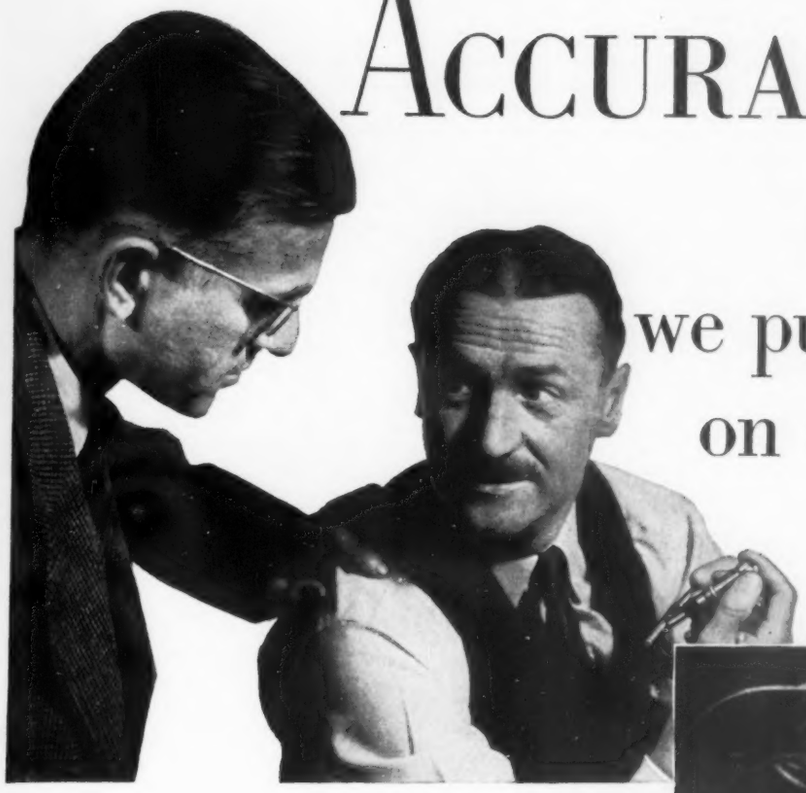
we put the "MIKE" on the bearings



Recent reports from Guest, Keen & Nettlefolds, Limited, of Cardiff, Wales, England, where the latest Morgan Continuous Rod Mill is now operating, demonstrate the vital importance of Morgoil Bearings in the closer control of output quality.

You may be interested in these extracts from a series of letters:

*"To roll rods to a tolerance of plus or minus .0035" is quite possible with a heating furnace that can hold a uniform temperature and a mill of the Nettlefolds type equipped with Morgoil Bearings throughout."

*"We can set up the finishing mill so accurately that a trial bar stuck in at No. 11 will go around the repeater and straight through to the reels, and the only reason for putting it through is to take the shine off the passes."

The Morgoil is a sealed, flood-lubricated sleeve-type bearing, precision built, mirror finished. The inner sleeve rides continuously on an unbroken film of oil.

Morgoil Bearings can readily be installed in existing roll housings. They permit the use of roll necks up to 75% of the nominal roll barrel diameter.

Built for all sizes and types of hot and cold mills having roll diameters from 8" to 60".

Patented in the United States and foreign countries.

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R2

Morgoil MORGAN WORCESTER ENGINEERS AND MANUFACTURERS *Bearings*

the operator cannot be sufficiently safeguarded by ventilating the container there are available relatively simple masks, half masks and respirators. Some of these devices are so simple that where fresh air can be reached in a relatively short distance pumps or blowers are not always necessary.

Fireproofing Clothing

As regards protective clothing, there are various types of gloves and mittens, hip and safety leggings, spats and sleeves, and one- and two-piece suits on the market. Some of these are made of asbestos as a protection against heat and of chrome leather and fireproofed duck against splashes of molten metal or sparks. It is also stated that good results are obtained in fireproofing clothing by the use of chemical solutions. In one treatment the garments are first dipped in a solution of 3 pounds of sodium stannate in one gallon of water, then wrung out and dipped in a solution of ¼-pound of ammonium sulphate per gallon of water. The garments then are wrung out thoroughly, dried and put into service. It is stated that these garments will stand at least five dry cleanings without losing their fire-resisting qualities. Naturally, they should not be washed with water.

The question is sometimes raised as to whether acetylene is in itself poisonous and whether a leak of acetylene into a confined space might be detrimental to a welding operator's health. Such question may result from the fact that before calcium carbide was available commercially, acetylene was made by incomplete combustion of coal gas and the impurities attendant on such a process were to be expected. This process is no longer in use.

Acetylene in high percentages acts as an anaesthetic and as a matter of fact it is used with oxygen by doctors and dentists for that purpose. In welding and cutting, however, we need not concern ourselves with atmospheres containing much over 2½ per cent acetylene as such could not exist in the presence of a flame since about 2½ per cent acetylene in air constitutes the lower explosive limit.

When welding or cutting or using a flame of any kind, a certain amount of oxygen is taken from and a certain amount of carbon dioxide is added to the atmosphere. In a closely confined space one must therefore guard against too great a depletion of oxygen and too great an increase in carbon dioxide. The heat produced by the combustion and its possible effect on the operator in such a space should also be considered. For the purpose of this discussion, we may regard atmospheric air as consisting of 20 per cent oxygen and 79 per cent nitrogen. Carbon dioxide is present only to the extent of about 5 parts in 10,000.

Investigators have shown that the percentage of oxygen in the air may be diminished to a certain extent without noticeable effect, especially if the difference is made up of nitrogen. A reduction to 14 per cent oxygen under these conditions produces little or no physiological effect. Investigators have also found that an increase in the carbon dioxide content of the air to about 3 or 4 per cent so increases the rapidity of breathing as to give unquestioned warning that the air is being rendered unsuited for breathing.

The chemical equation for the complete combustion of acetylene shows that two volumes of acetylene and five volumes of oxygen react to produce four volumes of carbon dioxide and two volumes of water vapor. In a neutral welding flame two volumes of this oxygen are supplied through the welding blowpipe and three volumes are taken from the atmosphere. If therefore we have a welding blowpipe consuming 20 cubic feet of acetylene per hour, 30 cubic feet of oxygen will be taken from and 40 cubic feet of carbon dioxide will be added to the atmosphere. The combustion of each cubic foot of acetylene produces 1475 B.t.u. Such an amount of heat alone requires the ventilation of tanks and other small confined space. In fact, such an amount of heat would probably drive an operator from an insulated tank before any noticeable effects from other causes were produced. The circulation of at least 125 cubic feet of fresh air for each cubic foot of acetylene burned in such spaces is recommended. Workmen likewise consume oxygen and give out carbon dioxide but the amount compared to that attributable to the flame is small.

Adequate Ventilation Needed

The experience gained in the literally millions of welding and cutting operations performed each year shows that practically the only health hazard encountered has been when working with materials involving lead or zinc in which cases adequate ventilation and in specific cases protection for the workman may be needed.

When welding on brass or bronze or when using a bronze filler rod, certain precautions are advisable when the work is being performed in a confined space or in a location such that any fumes are not carried away from the workman. There are on the market today certain bronze welding rods which are free flowing at relatively low temperatures and such rods consequently do not give off vapors to any appreciable extent.

When welding on brass, bronze,

Food Goes Down and Around

HANDLING food products packed in cartons and serving three floor levels in a large food processing plant, this roller spiral conveyor utilizes in the neighborhood of 6 tons of steel in various forms. It was designed and built by the Mathews Conveyer Co., Ellwood City, Pa. Standing 27 feet high, it has 11 turns. More than 1620 feet of 14-gage 2½-inch diameter seamless steel tubing was required for the 1080 rollers which are ball-bearing mounted. Approximately 1/3 mile of cold rolled steel, weighing more than ½ ton, was used for axles alone. The unit contains 432 pounds of ball bearings and the rollers, plus their axles and bearings, weigh nearly 3 tons. Structural shapes, used as frames and supporting members, approximate 3 tons

NEW BECKER OVENS

- The New Becker Oven Battery of The Public Service Electric & Gas Company was placed in operation at Camden, New Jersey, in October 1935.
- Equipped with the latest type of self-sealing doors and having as a new feature, *exceptionally low differential pressure*, this installation commands the attention of the by-product coke oven industry.

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BECKER OVEN PLANTS . . . GAS PRODUCERS . . . WATER GAS PLANTS . . . LIQUID PURIFICATION PLANTS . . . PHENOL REMOVAL PLANTS . . . MATERIAL HANDLING PLANTS . . . BY-PRODUCT EQUIPMENT . . . BENZOL PLANTS : : :

THE KOPPERS CONSTRUCTION COMPANY

Pittsburgh **Pennsylvania**

lead or zinc coated surfaces, the degree of protection necessary for the workman naturally depends on the location in which the work is being performed. In fairly open locations, it is usually sufficient to drive the vapors away from the workman by means of a stream of air or to remove them by suction. In more confined spaces masks provided with air from an outside source should be used. Some prefer a simple mask with large hose leading only such distance as is necessary to assure a pure air supply, the workman simply breathing in the fresh air in a normal manner, no pump or forced supply of air being used. In other cases, however, air under pressure is employed.

The great variation in size and shape of confined spaces as well as in the number, size and arrangement of openings to same prevent the suggestion of a definite procedure but it is recommended that when gas welding or flame cutting in a confined space proper consideration be given to adequate ventilation, a rope to the workman, and a watchman. These constitute the sensible safeguards to workmen in the space against oxygen depletion, carbon dioxide increase and heat.

Association Surveys Registration Laws For Engineers and Draws Conclusions

CONTRASTING engineering license laws with those of law and medicine, American Association of Engineers, 8 South Michigan avenue, Chicago, has screened out perfunctory legal phraseology and found color and interest in many minor provisions of the registration laws. The December issue of *Professional Engineer*, the association's official publication, is devoted entirely to this subject. This is said to be the first time any such survey has been published.

The discussion of the requirement made in many state laws that registered engineers provide themselves with seals of a specified design bearing name and registration number is typical of the attention given by the survey to these highly significant details of registration. When a state positively requires that all maps, specifications, valuations, etc., emanating from a public works department of the state or its subdivisions be executed by a registered engineer—and the survey declares that ten states do specifically make such provision—and further provides that each registered engineer affix his seal to all such documents prepared by him, there is afforded excellent opportunity for check-up on unlicensed engineers.

Enforcement Is Necessary

If every county and state officer whose duty it is to record such documents, if every state official and commission authorized to review these papers made it his business to check this simple item of the imprint of the registered engineer's seal, the enforceability of license laws would be greatly advanced, in the opinion of the association.

However, the survey goes on to show, only 26 states mention seals in the statute governing registration, and two of these make it optional with the registrant. Three additional states require endorsement of such papers with the name and license number of the registrant which has substantially the same effect. There is no indication of the degree of cooperativeness that has been obtained from those who review and record documents toward strict enforcement of the provisions regarding use of seals.

Certain conclusions are made as a result of the survey. "In medicine and law, experience has shown that for steady improvement of professional standards it is necessary to have the support of a majority of members. Through membership all grades of practitioners can be brought to appreciate the importance and ultimate benefit to individuals of such standards. No obstacle is interposed; all reputable practitioners are eligible for membership. No geographical limitations stand in the way.

"These two great associations are agencies through which the consensus is determined and announced. The public through them becomes aware of the ideals and objectives of each profession. It responds with legislative provisions that are as beneficial to society as to the professions. The masses of the profession in each case are mobilized; the highest type of individual practitioners in this integration lead through the respect they command and the standards are solidly built upon the consensus.

Legislation Not Effective

"Engineers have tried for years to do a thing which is utterly inconsistent with their usual respect for natural laws. They have tried to superimpose upon an unstable and unorganized professional mass a beautiful superstructure for which the masses are unready. Organizations which represent the highest type of men in the profession from the standpoint of training and experience have believed that the same sort of standards can be legislated for the masses or irrespective of the masses.

"This job will have to be done in the genuine engineering way. Foundations will have to be laid to cover the whole extent of the profession. No single branch of the profession can do it; all the branches, differentiating themselves as such cannot accomplish the task. The licensed engineers alone represent a pathetically small fragment of the profession.

"Engineers will have to forget all the distinctions that set them apart as more or less proficient or distinguished, and work through a single agency not limited to any state or section, to any vocational group, to licensed or unlicensed practitioners, and develop the consensus; then through strong leadership raise the standard and keep back of it the support of the majority of engineers."

Steel Emblems

AN AUTOMOBILE plate for advertising use and which enables the car owner to display his initials, has been developed by the Dura-Products Mfg. Co., Canton, O. From its applications is derived its name, Nishelad. The above illustration shows a combination of an advertising display and the car owner's initials. When desired, the plate is provided with a reflector for purposes of safety. The initials are permanently attached by inserting two tabs through slots in the plate. These plates are formed from steel sheets and are finished in white enamel

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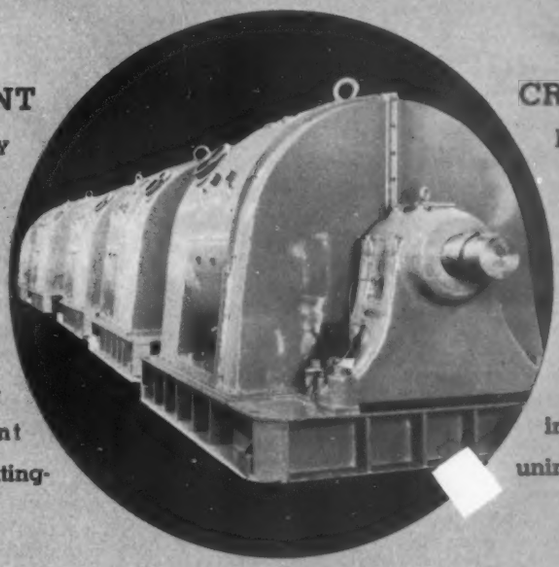
because the Steel Industry has found that there are many drives that can be operated more efficiently and, despite the somewhat higher initial cost of installation, more economically with direct-current motors than with alternating-current.



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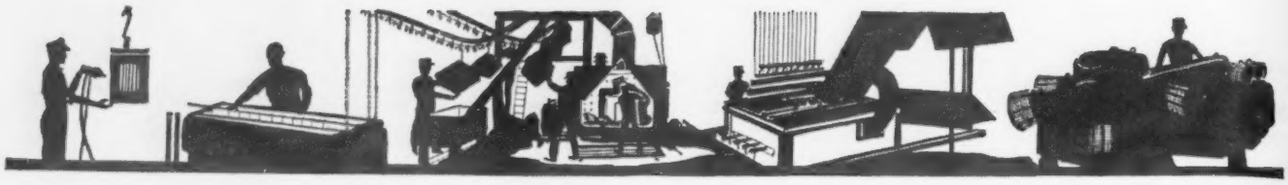


Reviewing Some Current Methods for Treatment of Metal Surfaces

PRIMARY considerations in the selection of surface preparation methods are the resultant surface and economy. Speed is a direct adjunct of economy in production and in most cases the two factors can be considered as synonymous. Because of these considerations electro-methods of surface preparation have been coming to the front with more or less rapidity, and many disputes and discussions have arisen over the relative merits and faults of the various processes.

When the alkali electrocleaner was introduced, industry found a rapid, economical and thorough method of cleaning, but some difficulty was experienced with embrittlement of ferrous parts. However, while embrittlement does take place in an alkali electrocleaning process, this fault is considerably exaggerated. It is true that springs and other delicate parts will be permanently injured by this treatment, but embrittlement, in most cases, is temporary, and can be removed by boiling the parts in water for a few minutes.

The electrolytic cleaning process which uses solutions of sodium phosphate or sodium carbonate is efficient, except in the case of delicate parts. It is recommended that a potential of from 6 to 10 volts and a current density of not over 10 amperes per square foot be used. Iron anodes are used ordinarily but in many cases the steel tank which holds the solution is used as the anode. This latter practice is not recommended, however, because of the difficulty involved in cleaning the walls of the tank. Removable iron anodes are easily cleaned and therefore preferred.

THERE are several patented processes which successfully clean ferrous parts electrolytically without embrittlement. One method is the type which is essentially a chemical removal of scale and rust with a simultaneous electrodeposition of lead or tin for the immediate protection of the cleaned surface. This process requires the use of four tanks, one containing an acid bath, one an alkaline bath, one hot water, and the last cold water.

The acid bath is made up from sulphuric acid, hydrochloric acid, salt and water; the alkaline bath can be any standard alkali solution. A potential of 6 volts and a current density varying from 60 to 100 amperes per square foot are used. Lead anodes are used in the acid bath and alternate lead and iron anodes in the alkali bath. A rusty steel part is immersed in the acid bath for 2 or 3 minutes, rinsed in hot water, immersed in the alkali bath and rinsed again. The entire process takes about five minutes.

Parts thus treated have a thin film of lead deposited on them, which must be removed if a paint or electroplated finish is to be applied. For this reason a reversing switch is placed on the alkali tank and lead coated parts are stripped by making them the anodes for a few minutes.

Of course in many cases this lead coating is better left on the parts, especially if they are to be shipped without any further finishing. It is claimed that ferrous parts can be left in the cleaning bath for considerable lengths of time without injury. Even springs, it is claimed, have been allowed to remain in the bath for some time with no apparent harm from embrittlement.

Another process which, it is claimed, will clean ferrous parts electrolytically without embrittlement has been put forth recently. This process is simple and consists of a preliminary cleaning and pickling by making the articles to be treated the cathode in a sulphuric acid bath which can vary in concentration from 2 to 20 per cent. The conditions under which this preliminary process is carried out vary greatly according to the type of work being done; current densities from 10 to 150 amperes per square foot, and temperatures from room temperature to 160 degrees Fahr. are used. The time required varies from 1 to 6 minutes. Then, without rinsing, the articles are made the anode in an electrolyte of 25 to 75 per cent sulphuric acid until they are bright. They are then rinsed with water and are ready for electroplating or other processing.

STILL another type of electrolytic surface treatment is a departure from the conventional types in that the metal surface is changed chemically and the parts cannot be electroplated. However, this chemical change makes the surface corrosion resistant and forms an excellent base for organic finishing materials. In fact a bond is formed between this type of surface and the finishing material which is superior to that obtained if the metal merely were made chemically clean. In this process the metal surface is coated with zinc phosphate which is highly corrosion resistant in itself, and parts thus treated may be shipped unpainted if desired.

The parts to be treated are first cleaned free from grease and then suspended in the electrolytic bath of

Booklet on Electroplating

REPRINTS of the four articles on "Control of Electroplating" appearing in this department for Jan. 27, Feb. 3, 10 and 17 are available in the form of an attractively printed 16-page booklet, 8¼ by 5¼ inches in size. Price is 25 cents each, postpaid, which covers cost of printing and mailing. This booklet makes a valuable addition to the plant or research library. Address Readers' Service Department, STEEL, *1213 West Third street, Cleveland.*

zinc phosphate for from 3 to 5 minutes. The coating formed has a high dielectric resistance. It builds up on an area until the resultant resistance prevents the formation of additional deposit with the result that a coating of uniform thickness free from pinholes is developed over the entire surface. The process is carried out at an elevated temperature (approximately 155 degrees Fahr.) using 60-cycle alternating current at current densities varying from 35 to 50 amperes per square foot and voltages varying from 10 to 30, depending on the shapes of the articles treated.

One automobile manufacturer using this process to rustproof headlight shells found it best to remove grease by wiping the parts with a cloth soaked in a low-grade gasoline, which left a fine film of oil; otherwise the rapid action of the acid solution appeared to attack the steel before the zinc was deposited. The zinc phosphate coating should be wiped with a clean cloth before applying an organic finish.

Alternate Method Available

This phosphate coating can be obtained by a nonelectrolytic process and an even more corrosion resistant, but more costly, coating is obtained when zinc or cadmium plated parts are immersed in a solution similar to the one used in the electrolytic process. In this process the surface of the zinc or cadmium is converted into a phosphate without dissolving enough of it to lessen its protective effect. The coating is also more ductile than that produced by the direct electrolytic process.

The protection which a zinc or cadmium coating gives has long been known to industry but neither of these coatings takes a paint or lacquer coating well. Phosphate processing, the cost of which is negligible, not only produces an excellent surface for paint but increases the corrosion resistance many times. A modification of the dip process has been adapted so that large structural galvanized surfaces can be treated by spray or brush so that paint will adhere to them permanently.

The above processes are all given as types; there are many modifications, each for a particular purpose.

For Continuous Spray Painting

AN UNUSUAL adaptation of spray painting to the continuous process of production is the swinging arm machine and down-draft spray booth, developed by the DeVilbiss Co., Toledo, O., and shown in the accompanying illustration. The machine operates on the principle of an arm, with spray gun mounted on the lower end. There are two such arms swinging back and forth in opposite directions over the product to be sprayed.

Speeds May Be Varied

Supported in a suitable frame, the machine is mounted on the ceiling above the conveyor which carries the work to be sprayed at a speed of 10 to 40 lineal feet per minute, depending on such factors as type of surface and kind of finishing materials used. The mechanism which drives the arms is so designed that a slowly increasing and decreasing reciprocating motion is obtained which compensates for the arc which would be produced by swinging the arms from a fixed position.

The spray booth on this machine was especially designed for the conveyor used in connection with the swinging arms. Booths are equipped with fan and exhaust systems, each booth being specially built to meet the requirements of the work for which it is purchased.

Rust Inhibitive Primer For Use on Iron and Steel

Ever since man first learned to transform iron oxide into usable solid shapes he has been confronted with the problem of preventing the fabricated metal from reverting to its natural state through the process of rusting. What shall we do with rust? has been an inevitable question. Usually the question has been met with the assertion: Remove it. From this point there is a mass of conflicting opinion.

Whether done by chemical or mechanical means, removing rust from iron and steel is expensive and often impractical. The Flood Co., Cleveland, manufacturer of Penetrol, a protectice priming material, asks, "Why remove all the rust?" The company points out that iron oxide (rust) is the most stable form of iron and that it is a good pigment in metal primers.

Penetrol, which penetrates, permeates and diffuses through the rust, uses the rust as an inhibitive pigment. It grouts the rust, forming a foundation for exposure coats. The primer insulates each particle of rust from the others and also from the base metal itself. The liquid dries all the way through into a hard, but elastic film.

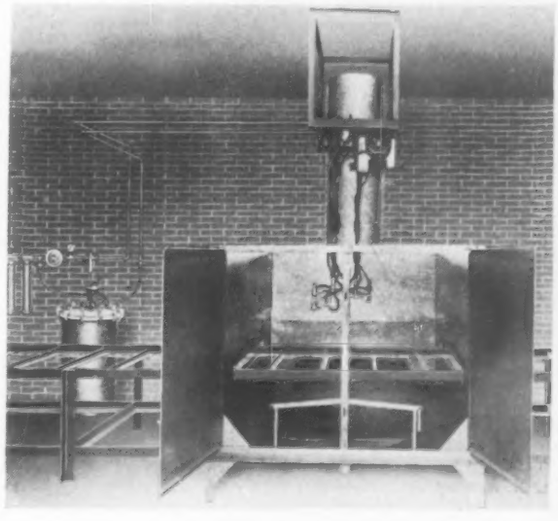
Application of the primer does not eliminate the necessity of exposure coats, but serves to protect the exposure coats from attack from within the metal itself. However, the primer coat does form a second line of resistance in case of failure of the exposure coats.

The primer is a blend of natural oils, without any added dryer. The coating dries in about 48 hours by polymerization of the oils.

Applications of Penetrol aid in the formation of a bond between the surface and exposure coats. It provides an insulating priming coat between the ferrous base metal and an applied coating such as aluminum paint, and can be used also as a vehicle for aluminum powder used as an exposure coat.

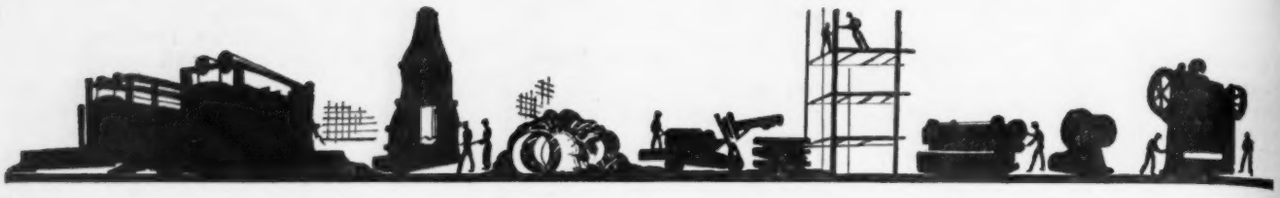
Acid and Alkali Resistant Paint for Magnesium Alloy

Adaptations of its Plicote acid and alkali resisting paint by the Watson-Standard Co., Pittsburgh, to special alloys where adhesion has been a problem have shown remarkable results, this company states. In one case recently the company has been able to meet the requirements for finish for goggle frames made of magnesium alloy. The coating applied proved corrosion resistant and in addition adheres tenaciously.



Swinging arm machine and down-draft spray booth facilitate spraying on a production scale

Methods and Materials



Use Carbon-Moly Steel for Valves

WHEN the various valves for the United States navy's new cruisers and destroyers came up for consideration, thorough investigation was made to determine the best material which in addition to other requirements would provide adequate creep strength. Carbon-molybdenum cast steel was selected. Not only has this material met the specifications, but it has proved to be economical in first cost and in manufacturing costs.

According to the *Moly Matrix*, published by the Climax Molybdenum Co., New York, the valves were made by the Hancock Valve division of the Consolidated Ashcroft Hancock Co., Bridgeport, Conn., and cover a wide range of sizes and functions. They include boiler feed line, superheater drain, superheater vent, economizer drain, and economizer vent valves. They also include surface blow valves, salinometer valves, boiling-out valves, and a number of others for miscellaneous purposes.

Analysis of the carbon-molybdenum steel is as follows: Carbon, 0.35 maximum; manganese, 0.50-0.75; silicon, 0.20-0.45; phosphorus, 0.04 maximum; sulphur, 0.04 maximum; and molybdenum 0.40-0.60 per cent. Tested, this material must develop the following minimum physical properties: Tensile strength, 70,000 pounds per square inch; proof stress, 35,000 pounds per square inch; elongation in 2 inches, 20 per cent; reduction of area, 30 per cent; and cold bend, 120 degrees around a 1-inch pin.

The list of properties takes no account of creep strength, which is most important, since the steam pressure is 465 pounds and the temperature 850 degrees Fahr. Valve clearances are very close, and they must be maintained in spite of the temperature and pressure. If elongation occurs because of creep, a valve quickly becomes useless. Leakages open the way for erosion by the steam under high pressure.

It was found in the course of manufacture that the steel had good machinability, and that the percentage of rejects from any cause during the process of production was gratifyingly low.

S S S

Tempering Bath Is Heated By Electric Strip Units

Tempering of dies and machine parts is a process which requires accurate temperature control. To utilize the advantages of electric heat for this operation, one manufacturer built a small salt bath tank equipped with electric strip heaters.

This tank, 10 inches wide, 20 inches long and 15 inches deep, has six 18-inch embedded-type strip heaters clamped to the bottom. This provides a metal-to-metal contact which insures economical heating. Temperature is controlled by a three-heat switch which makes possible temperatures of 450 or 500 degrees Fahr., whichever is required by the materials to be tempered.

Through use of this method of heating, the manufacturer has eliminated fire hazard and objectionable fumes and in a simple manner has provided accurate control of temperature.

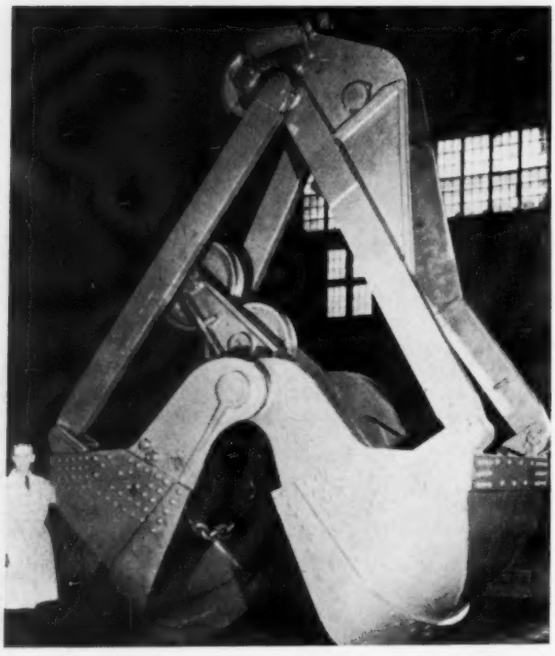
S S S

Finding More Applications For Percussion Welding

Increasing use of alloys of aluminum, copper and corrosion-resistant metals, has stirred up considerable interest in the resistance welding process known as "percussion welding," broadly described as the concentrating of relatively large quantities of both electrical and mechanical energy at the point of engagement between the members to be welded for an almost inappreciable length of time.

During the past few years devices have been developed that restrict the duration of current flow to 1 or a fraction of 1 cycle of alternating current. The chief advantage of this short current duration is that it can be applied to metals having critical welding temperatures. Theoretically, the best weld is obtained when the

15-Ton Welded Dredge Bucket



WHEN this power-arm type Williams clam shell dredging bucket goes down and under water in harbor excavation work it comes up with 6 cubic yards of material. The 30,000-pound bucket was designed and fabricated by the Wellman Engineering Co., Cleveland, of built-up welded parts formed from low-carbon alloy steels. The bucket is over 17 feet high, its immense proportions being in contrast with the man standing at the left

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area heated to welding temperature is limited as nearly as possible to the surface to be joined. A further advantage is that it produces less upset in the case of a butt weld and less indentation on the outside surfaces in the case of spot welds.

Usually there is a slightly lower total kilowatt-hour consumption of current, and, in some cases, an increase of production. Although percussion welding was used originally for welding condensed sections, engineers of the Thomson-Gibb Electric Welding Co., Lynn, Mass., consider there is, theoretically, no limit to the cross-sectional area which can be welded by this process.

\$ \$ \$

Recognizes Stainless Steel For Institution Equipment

Definite recognition of the merit and economy of stainless steel is seen in the recent action of the specification department of the City of New York in which 200 specifications covering utensil equipment for various departments will be rewritten to include stainless steel. Such departments as the department of health and department of hospitals will be affected in the main.

Suitability of stainless steel for institution equipment has led to its adoption for a wide variety of purposes. Institution equipment receives far more severe service than similar equipment in domestic use. Consequently the ease of cleansing and the durability of stainless steel are important.

\$ \$ \$

Hard Facing Made Easier

To facilitate the hard facing of valve disks and seats, a prominent valve manufacturer has devised an ingenious fixture. This fixture comprises a low-speed motor, a gear speed reducer from a washing machine, and a dividing head from a milling machine. Any desired speed of rotation from ¼ revolution per minute up can be obtained, and the job can be tilted to any angle so that the point at which the operator is working is always level.

Roller Bearings Utilized in Lifting Mechanism of Cape Cod Railway Bridge

USE of antifriction bearings in the lifting mechanism of the vertical lift railway bridge over Cape Cod canal at Buzzards Bay, Mass., suggests that future bridges of this type will incorporate this feature of design. The Buzzards Bay bridge, claimed to be the longest vertical lift span in the world, is equipped with roller bearings on the axles of the main sheaves. This is said to be the first major application of roller bearings to this type of bridge.

A general description and illustration of the new bridge appeared in the Dec. 2 issue of STEEL. Initial raising of the span took place on Sept. 20 and was accomplished with ease. It is stated that because the roller bearings effected a 90 per cent reduction in friction, the structure was balanced without difficulty and with considerable saving in prime movers and motive power.

Sixteen self-aligning roller-bearing pillow blocks, shown in Fig. 2, carry the 10,000,000-pound, 544-foot lift span and counterweights. The span weighs 4,160,000 pounds and the total radial load on each of the 16 pillow block bearings is 600,000 pounds. This roller bearing equipment, weighing 72 tons, was manufactured by the Bantam Ball Bearing Co., South Bend, Ind.

The pillow blocks are 52½ inches high, 27¼ inches wide and have a base 5 feet long and 16 inches wide. Each pillow block weighs 4½ tons. Roller bearings are of the self-aligning, straight roller type, incorporating the one-piece bronze lubricage which is claimed to assure the highest radial load carrying capacity with an estimated 90 per cent reduction of friction, as compared with the plain type of bearing ordinarily employed. Into the end caps are built straight roller thrust bearings of the self-aligning type to take thrust loads which may be encountered.

Supported by 80 Cables

The lift span is suspended on each end by a group of forty 2⅜-inch diameter plow steel cables operating over four 15-foot diameter main sheaves and operates through a vertical lift of 130 feet in 2 minutes. The group of four sheaves on one end is shown in Fig. 1.

In the lowered position, the balance of the lift span and counterweights is such that the span is 20,000 pounds heavier than the counterweights. The span also is somewhat heavier than the counterweights in the opened position. At times, because of sleet or snow on the span, the loads may be increased by an additional 60,000 pounds.

The total operating load for lifting of the partially counterbalanced movable span is distributed between the 16 pillow block bearings operating at a maximum speed of 1⅜ revolutions per minute and driven by two 150-horsepower motors geared to the main sheaves, one in each tower of the bridge. Normally, it is said, a structure of this size would require two 300-horsepower motors; this saving being attributed to the use of antifriction bearings.

Two power plants are used to lift the movable span, one in each tower. These are synchronized to keep the span level in all positions. Two gasoline-driven motor-generator sets will be used for auxiliary power in case of a breakdown of main power lines.

The 2000-ton weight of the span is counterbalanced at each end by a 1000-ton steel-encased concrete counterweight connected by the 40 cables and operating inside each tower. When the bridge is raised

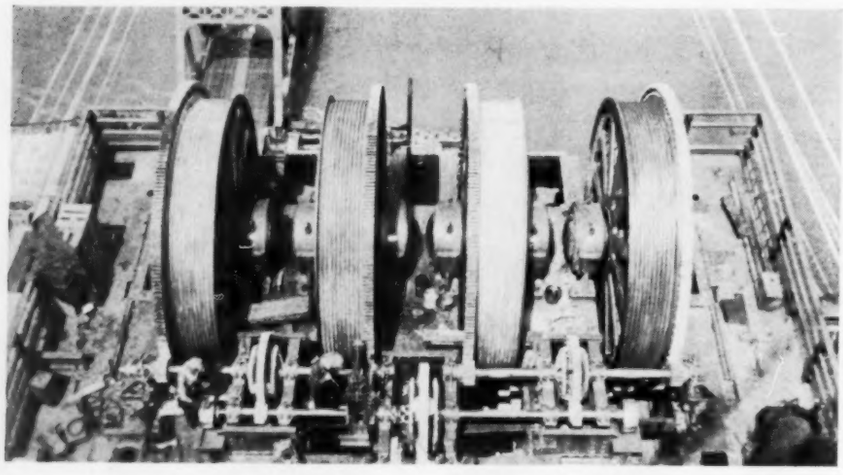


Fig. 1—One group of four 15-foot diameter main sheaves being installed atop one tower of the Cape Cod canal vertical-lift railway bridge

there is a main cable unbalance of 20 tons at each end, because of the weight of the main cables shifting from the movable span side to the counterweight side. This is compensated for by auxiliary counterweights suspended from steel cables running over auxiliary sheaves at the tops of the towers and connected to the movable span at the quarter points. Normally, the bridge will be kept in the raised position.

At the top of each tower is an enclosed room to house the sheaves, pillow blocks, motors and other machinery. In the north tower is located the operator's house with all switchboards and controls in a room nearby. Both machinery rooms are reached by elevators operating from the bridge deck at a speed of 100 feet per minute and with a total travel of 181 feet.

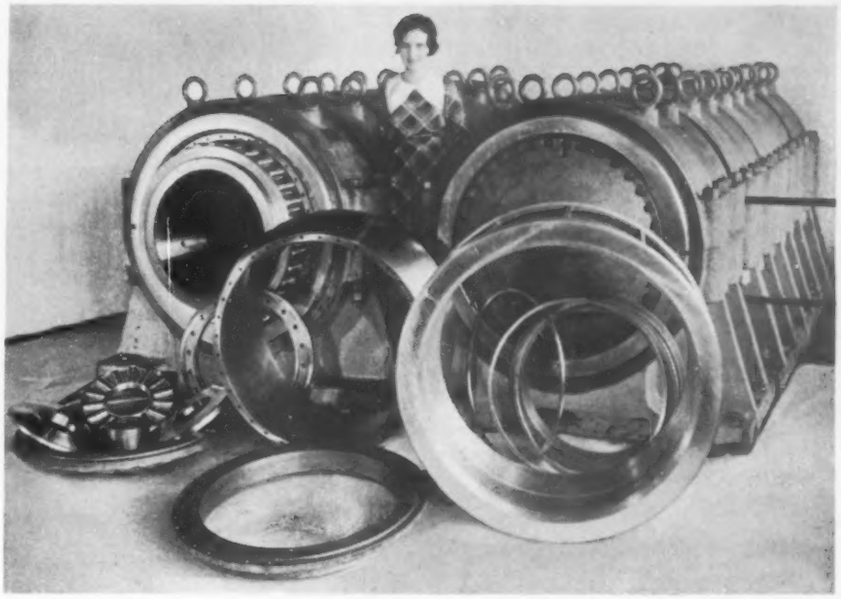


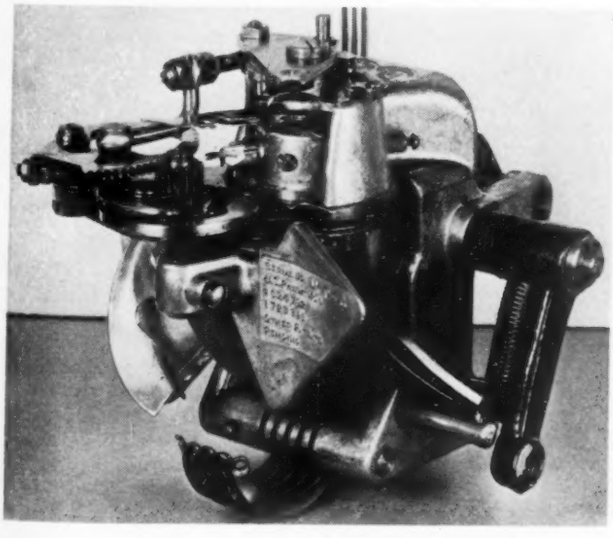
Fig. 2—Main sheave bearings and housings for the Buzzards Bay bridge. Total weight of this equipment is 72 tons

New Unit Selects Yarns And Ties Them Together

A new yarn selecting and tying unit developed by Fidelity Machine Co., 3908 Frankford avenue, Philadelphia, performs an unusual function in that it automatically selects any desired yarns and joins them together. It is being used primarily as an attachment on hosiery knitting machines of different makes.

Yarn feeds into five selecting fingers from five cones. In operation, when one of the yarns is running continually into the machine, any of the other four yarns may be selected and joined to the yarn that is running in. The five yarns always are threaded through the selecting fingers and if there is always one yarn in the machine it is possible at any time to change the order by tying in one of the other four to it, thus instantaneously changing the complete arrangement.

Shown in the accompanying illustration, the new unit is made up of die castings, parts that are formed from cold rolled strip steel on punch presses, a number of tool steel parts and a gray iron casting.



Attachment for hosiery knitting machines consists of die castings, parts formed from cold rolled strip steel, a number of tool steel parts and a gray iron casting

Foreman Improvement Bibliography Compiled

A selected and annotated list of books, pamphlets and magazine articles published up to 1934 dealing with the development and training of foremen and the part they should play in production is contained in a revised 34-page edition of *Bibliography on Foreman Improvement* issued by the interior department, and sold for 5 cents by the superintendent of documents, Washington.

Discovery of talent, training foremen, principles of selection and placement of men, and industrial psychology are some of the themes in the book list; how to develop smooth running departments and responsibility and methods of training foremen are taken up in pamphlets listed; and how to conduct employment interviews, co-operation, safety measures, and motion and time studies are discussed in some of the magazine articles. Manuscript for the bulletin was prepared by Russell J. Greenly, University of Akron, Akron, O.

Iron, Important Metal, Almost Unknown in Purity

The Metal—Iron, by H. E. Cleaves and J. G. Thompson; cloth, 574 pages, 6 x 9 inches; 95 tables and 113 illustrations; published by McGraw-Hill Book Co. Inc., New York; supplied by STEEL, Cleveland, for $6, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This volume is the sixth Alloys of Iron Research monograph, the first appraisal ever published of the preparation and properties of high-purity iron. The first part of the book contains a critical review of existing methods for the laboratory and commercial production of electrolytic iron and a summary of the production of carbonyl iron, high-purity iron for special purposes, such as atomic weight determinations and commercial ingot and sponge iron. In the second part is a critical summary of published and unpublished data on structures and properties.

The practical metallurgist will be

particularly interested in the discussion of structure, mechanical properties, heat treatment and aging, corrosion and the effect of small amounts of impurities and alloying elements. The research chemist, physicist and metallurgist will find value in the concise evaluation of the physical and chemical constants, crystal structure and electric and magnetic properties which have been compiled.

Because of the remarkable magnetic properties being secured in iron of high purity the comprehensive discussion of magnetic characteristics should be of value to electrical engineers as well as to physicists working in magnetism.

Iron is the most important and valuable of metals but in spite of its importance relatively little is known of its properties when highly purified. This book gives what little is known and outlines what is not known, thus indicating fields in which interesting and profitable research may be undertaken.

Develops Phosphor Bronze Arc Welding Electrode

A new phosphor bronze electrode for arc welding bronze, brass, copper and certain ferrous materials has been announced by Lincoln Electric Co., Cleveland. Tradenamed Aerisweld, this electrode is said to provide a solid homogeneous deposit, having characteristics of true phosphor bronze with notably high tensile strength.

The electrode can be used either for fabricating new products or reclaiming old ones. Among its uses is welding galvanized steel sheets with which minimum disturbance of the galvanizing is essential. The electrode is of the shielded arc type for use with metallic arc. Its coating produces a gas which shields the molten metal from harmful effects of the atmosphere and assists in easing the flow of molten metal in the arc.

Welding current of positive polarity is employed on the electrode. Preheating of parts is unnecessary when welding any ferrous metal and lighter grades of copper and bronze. In welding heavy bronze or copper, some preheating may be desirable because of the high heat conductivity of these metals. In such cases, preheating is accomplished by using a carbon electrode with negative polarity and rapidly moving the arc over the area to be welded. For cast iron, low current is employed since excessive heat is detrimental to satisfactory welding.

The new electrode is made in two sizes, 5/32 and 3/16-inch, in 14-inch lengths, and comes packed in standard containers of 5 pounds net.

Welding, etc. . . .

by Robert E. Kinkead

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Significant Event

THIS is written 50 years to the day after Charles Martin Hall discovered the electrolytic process for the production of aluminum at Oberlin, O.

The boy had just graduated from Oberlin college. He had come under the spell of a great teacher of chemistry, a Professor Jewett. He was 22 years old. The discovery was no accident; he stated the problem clearly, solved it theoretically and on Feb. 23, 1886, proved it experimentally.

It is possible to evaluate the invention in terms of dollars or jobs or acres of floor space, but it seems to us that it deserves a rating in higher terms. It was a glorious vindication of the then newly conceived idea that scientific education, scientific methods and scientific research would permit man to go forward to undreamed heights of achievement. And the significance of the event is as great now, 50 years later, as it was then.

The discovery was the product of a great teacher, a brilliant and enthusiastic student, and scientific method. If an industry has tried to substitute for that combination, the shining example of Professor Jewitt and Student Hall may be studied with profit. Dull, inhibited minds do not make great discoveries. Barring genius, inventions are the product of a great teacher, overwhelming enthusiasm, and scientific method.

At the end of another 50 years, the event in which Charles Martin Hall was the principal actor will be just as significant as it is today.

Designers' Day Dreams

MACHINE designers might be interested in the current newsreel film showing X-ray motion pictures taken through a fluoroscope. The vital organs of the human body are shown.

No one knows much about what happens in terms of stress distribution in a machine part in actual operation. It either "works" or it fails. All the excess pounds of metal we put in machinery and equipment because we do not know these facts, would reach from somewhere to somewhere else a good many thousand miles away. While it is true that maximum stresses are almost always boundary stresses, if we knew more about what goes on inside the highly stressed members of a machine while it is working, we would know what to do about it.

Some beautiful theories are born of studies of the behavior of bakelite models stressed in polarized light. But these models are two dimensional. The actual part has three conventional dimensions, and there is logic in treating time as a fourth dimension. There are serious practical limitations to the proposal to get designers of machinery and equipment to treat these parts as four dimension problems—that is a laboratory job.

It is interesting to speculate on the value of an X-ray moving picture film of a machinery part in service which would show stress distribution in the part. It would certainly solve the problem of how to design with precision rather than by guess or trial and error. The job seems far from impossible.

Sparks and Flashes

H. W. Roth, president, Roth Welding Engineering Co., Detroit, reports that resistance welding in Europe is good but not so good as in this country. He ought to know, having invented one of the smartest adaptations of mechanical equipment to spot welding of the last 25 years. He reports flash welding in Europe up to 40 square inches cross section. Much greater cross section has been handled in Milwaukee.

Efficiency of Designs Facilitated by New Antifriction Bearings

BY D. E. BATESOLE
Assistant Engineering Manager,
Norma-Hoffmann Bearings Corp., Stamford, Conn.

RECENT developments in antifriction bearings and their applications are of much importance to engineers engaged in the design and modernization of machine tools, machinery, motors and other mechanical units. In many cases antifriction bearings make it possible for the engineer to produce more efficient designs and to effect mechanical arrangements which provide for greater accessibility and offer other advantages.

One interesting development is an extra light series of inch-dimensioned bearings in both the ball and roller types in which the outside diameter is small as compared with the bore and in which the width is also considerably less than that of other bearings having the same bore. Although first introduced a few years ago, the possibilities of these bearings for applications in which there are space limitations, are only recently becoming fully appreciated. They are proving highly useful for machine tools, for example in automatic machines, and other applications where the centers are close and where a large bearing bore is required. These bearings also present interesting possibilities where the designer prefers to work with inch rather than metric dimensions.

Seals Are Built-In

Another recent development gives to the consumer the benefit of a lower cost for mounting parts and also in many instances enables him to reduce assembly time. We refer here to the various types of ball bearings with the seals built into the bearing itself. With this development, the user does not have to supply the seals and the cost of mounting bearings is reduced accordingly. These seals may be of steel or of felt.

Of course where the bearings are of the completely sealed type, it is desirable to have a large space available between the seals, for the grease which is initially packed into the bearings. For this reason the width of the completely sealed bearing has been increased from the standard width. In a new bearing recently announced and which is known as the "cartridge" type, the width of the completely sealed bearing has been extended so that it is now the same as the width of a double-row ball bearing, although only a single row of balls is used. In this way a large volume is provided for the grease. Many of the felt sealed bearings have the seals removable and in the cartridge bearing which has a specially designed metal seal, the seals are likewise removable for relubrication, inspection and cleaning of the bearing parts.

Shoulder-Type Bearings

Another instance of the trend toward lower bearing mounting costs is the development of the snap wire or shoulder type of ball bearing. This new series consists of the conventional standard or shielded bearing with a shoulder wire in a groove in the outer ring, this groove being close to the face at one side. This construction permits a through bore in the housing without shoulders. The bearing is fixed endwise by clamping the shoulder wire between the face of the housing and the cover plate.

For the many new applications of bearings in small instruments, scales, relays and other sensitive apparatus, ball bearings of exceedingly small size are now available. In some instances it has been found necessary to rotate the balls directly on a hardened and ground pin or shaft. Such bearings frequently referred to as "pin" bearings are unusually sensitive. They employ only a few large balls without a cage or retainer but have a conventional outer raceway. Complete ball bearings with inner and outer rings are now available as standard units in sizes as small as $\frac{3}{8}$-inch outside diameter.

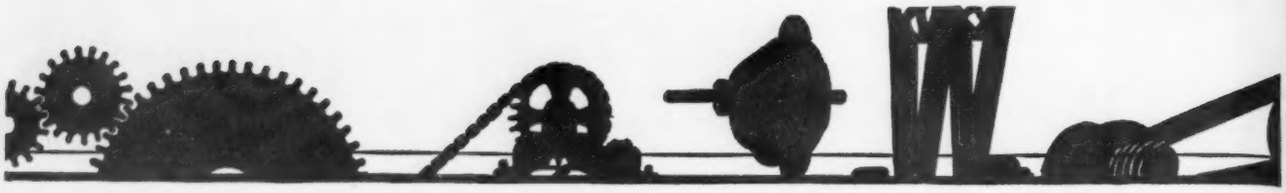
Designing engineers will also be interested in the recent increase in available publications of suggested bearing mounting designs developed by the antifriction bearing manufacturers to assist their customers in working out the details of new and improved applications.

Motor Bearings Redesigned

As an instance of this specialized co-operation in particular fields we would call attention to a new bearing mounting which was recently worked out by our company for mine locomotive motors. In these particular motors, the chief cause for delay and high upkeep cost has been the rapid wear of the ball bearings originally applied at both ends of the motors. In the new design a cylindical roller bearing is recommended for use at the pinion end of the motor shaft and a ball bearing at the commutator end. With this new construction there is no possibility of binding when the motor heats up because the roller bearing takes care of the armature float when the motor shaft expands, by allowing the rollers to move freely across the outer raceway of the roller bearing. Former necessity for looseness of bearings in motor frames to permit expanding is thereby eliminated and this, together with the increased carrying capacity and shock resistance of the roller bearing, results in much longer bearing life.

These are a few of the more recent developments in the antifriction bearing industry. There are many more which result from the industry's continual effort to assist manufacturers of mechanical units in devising the most efficient bearing mountings for their machines.

Power Drives



Belt Stretch

ON FLAT belt drives properly engineered for the operating conditions, stretch should be the only operating problem. Leather belts are made of a natural fibrous material. These fibers are separated slightly by the repeated bending and straightening as the belt goes over the pulleys. With idler pulleys an additional reverse bend is added. It is these bends under tension which ultimately wear out a belt.

In new belts the leather fibers are contracted tightly together and so most of the normal stretch comes soon after the belt is installed. Belts that are not overloaded should operate with much longer periods between servicings after the first take-up. Pre-stretching belts removes much of this first stretch but if not installed soon after stretching the fibers partially contract again.

Recently a new method of manufacturing double leather belts has been developed which cements the belts while under stretching tension. The cement used is flexible but non-elastic so that it not only holds the belt from shortening when the tension, under which it is placed at time of cementing, is removed but also to a considerable extent resists stretching. The manufacturers state that such belts operating on properly designed drives with normal overload should not require more than one take-up. This is only one of the many recent developments toward improved operation of power drives.

• • •

Economy a Misnomer

BECAUSE one lubricant costs less than another does not always mean a saving. This is well illustrated by the experience of one medium-sized Chicago plant engaged in the manufacture of a varied line of specialty items from brass, aluminum and cast iron.

The plant has been in operation about 15 years. All lineshafts were equipped with a high-grade type of ball bearing, none of which has given any trouble so far. That the future may not be so promising was indicated recently by comment of the maintenance man who, with one full time helper and occasional assistance for extensive changes and reconstruction, handles all maintenance work in the plant, except rebuilding machine tools.

When asked about the frequency of lubrication, the maintenance man gave the amazing information that the lineshaft bearings were oiled every three weeks. With the light service and comparative freedom from dust with aluminum and brass machining this appeared so unusual as to require further investigation. Finally the story came out.

About two years ago during a spasm of economy an oil peddler came in with "a lubricant just as good and a whole lot cheaper." The purchasing agent bought and no doubt congratulated himself on the handsome saving he had made. But was it a saving?

Servicing Is More Frequent

Before that time bearings were lubricated every 3 months. Soon some began to run warm, so the time between oilings has been gradually shortened until it is now every 3 weeks instead of quarterly, 17 times a year instead of four times. In all probability before long the bearings will require still greater frequency of servicing to prevent some bearing failures. To take care of the extra oil, tin containers had to be hung beneath each bearing, a condition which in connection with a properly designed and serviced antifriction bearing indicates something wrong.

With four times as much servicing and approximately four times as much lubricant where is the economy? No doubt the purchase would still show a loss even if the oil cost nothing. But the greatest danger lies in the increased probability of early bearing failures with their expensive interruptions to production. And probably the maintenance man will be blamed.

It is unfortunate that the opinion of "working" maintenance men is treated so lightly or not even sought in many plants. These men know their work and their equipment, how it acts in service and how much trouble or satisfaction it gives them. Too often their suggestions are squelched with a sarcastic comment that they are trying to get out of work, not appreciating the fact that the less a maintenance man has to do the more valuable he is.

• • •

Portable Machines

FLEXIBILITY of arrangement of machines is an important factor in determining drives and layout or arrangement of machine tools. However, to obtain the desirable flexibility does not always necessarily mean wholly group or individual drives. In many cases a combination of the two provides not only the most economical but efficient arrangement.

For example in one midwestern plant engaged in light manufacturing a group of machines was lined up for lineshaft drive for operation on a production schedule of different products. All machines but two were used on all items; these two were used about one week out of the month on a special product. A study indicated that these machines were not only in the way during the other three weeks but their position in the line was not the best.

The solution was to install individual motors on the two machines and remove them to storage for their idle three weeks. When they are needed they are trucked out on a lift truck and set in the best operating position, which in this case is at right angles to the group of machines and several feet out of the line. When the job is over they are wheeled away again to storage. As the machines are small, requiring only fractional horsepower motors, they are easily plugged into a special overhead socket.

Similar applications of portable or individually-driven units in a group offer opportunities of simplifying the drive problem. This is especially true where much higher speed is required or a group-drive machine uses considerably more power than the others and its widely fluctuating requirements disturb the smooth operation of the lineshaft drive.

Iron Notch Is Stopped Under Full Blast Pressure

TO MEET the modern trend of electrifying all mechanical equipment for blast furnaces, the 2-motor automatic clay gun shown in the illustration was developed in 1933. This gun has a single clay barrel, with a capacity of 9 cubic feet which is more than ample to meet any condition. Under normal conditions only a fourth of this clay is used to stop the tap hole.

A distinctive feature of the electric gun is the elimination of the clamping mechanism. The gun is pulled into the hole and positively held in position by a flat rope attached to the furnace front and wound on a nonreversing (except by motor) worm gear winch operated by a 7½-horsepower motor mounted inside the boom; the splasher plate automatically is raised as the gun swings in position. Clay is discharged the moment the gun is in the hole and the iron notch is stopped instantly. The hole is stopped under full blast pressure and no one is required in the danger zone at any time. The entire equipment is controlled through a simple and inexpensive control located at any convenient point in the cast house. The gun proper is driven by a straight mechanical gear drive.

The first of these guns went into operation at the Lehigh division, Bethlehem Steel Co., Bethlehem, Pa., and was installed while the furnace was in operation. Approximately 715 consecutive full pressure stops were made with this gun before the furnace was taken off for relining.

The second of these guns was installed at the Riverside furnace of the Wheeling Steel Corp. Benwood, W. Va. Sept. 1, 1935 and has been making a remarkable record. The iron notch has been stopped against full wind pressure six times a day since Sept. 1, which, to December 1st, totals 540 stops. Many stops are against iron and slag in order to have a uniform load in their mixer ladle each time. The trough is not drained before stopping. On an average, only one wheelbarrow load of clay is used per stop, which maintains a 3½ to 4-foot hole that does not wash or slag out during the cast. The reason for this is that when stopping against full pressure a solid clay filling of the hole is obtained.

Minimizes Amount of Labor

The use of pricking rods and rabbles has been reduced to a minimum; in fact, the original pricking rod and rabble used when the furnace was blown in are still in use. Many hours of labor are saved on the furnace front, partly due to the ease of cleaning the nozzle and filling the clay barrel with the nozzle swung open. No nozzles have been burned nor has any short holes been encountered, although a standard 6 x 12-inch tuyere is wide open directly over the iron notch. Constant gas pressure is maintained and uniform moving and melting of the stock gives increased iron production and much lower flue dust loss.

Woodward Iron Co., Birmingham, Ala., recently installed one of these guns and has inaugurated the practice of stopping the hole at full pressure.

This type gun, patented in this country and abroad, is built and sold by Edgar E. Brosius Inc., Pittsburgh.

Seamless Chromium-Nickel Alloy Steel Tubes

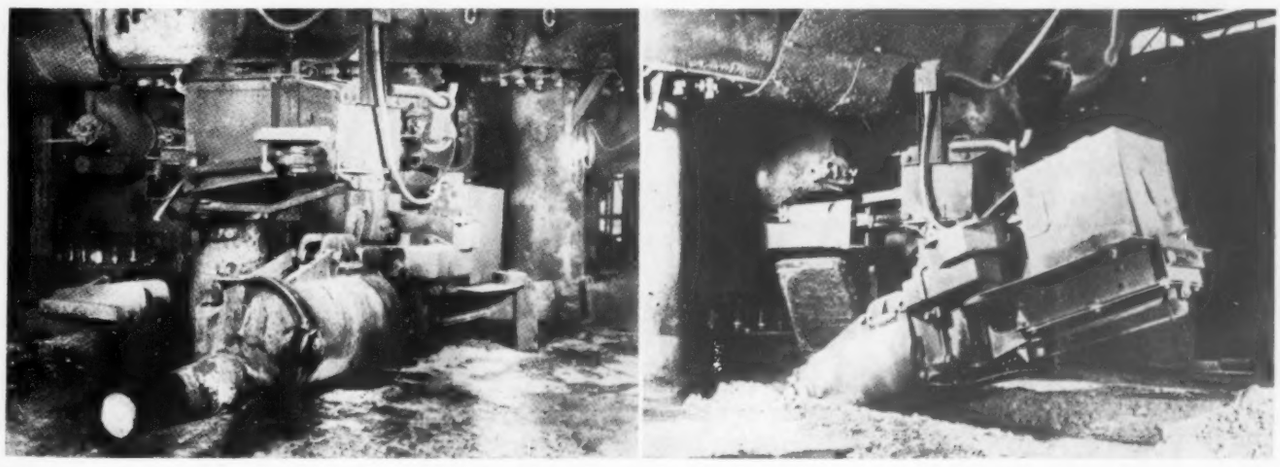
Commercial production of seamless tubes and pipes of an alloyed steel containing 25 per cent chromium and 20 per cent nickel suitable for high temperature equipment and in refinery operations has been started by the Babcock & Wilcox Tube Co., Beaver Falls, Pa. These products are available hot-finished in sizes up to 6 inches outside diameter and cold-drawn in smaller sizes.

This alloy has a high degree of oxidation resistance and is suitable for continuous operation at temperatures up to approximately 2100 degrees Fahr. It is a ductile material possessing great creep strength. Applications for the alloy will include high temperature cracking and polymerization in refineries, and in recuperators, thermocouple protection tubes, valves and heat resistant tubular members.

London Meeting To Study Problem of Metallic Wear

British Institute of Metals, Westminster, London, is arranging a special meeting to discuss the subject of "Metallic Wear"; it will take place in London, March 10, in connection with the Institute's annual general meeting.

The discussion will be opened by Dr. H. W. Brownsdon with a paper reviewing some of the major factors involved in metallic wear and indicating a method by which they can be assessed quantitatively.



(Left)—2-motor automatic clay gun, loaded and ready to swing into the iron notch. (Right)—Gun in position for stopping the notch

Progress in Steelmaking

Strip Steel Is Air Cooled

Between the roughing and finishing trains of modern broad continuous strip mills is provided a delay table where the partially rolled strip is brought to rest and allowed to cool in the air or is sprayed with water before being fed into the finishing stands. At one of the newer broad strip mills, however, this table is equipped with air sprays. These are designed to deliver sufficient air to cool the strip to the proper temperature for finish rolling without delaying its forward movement.

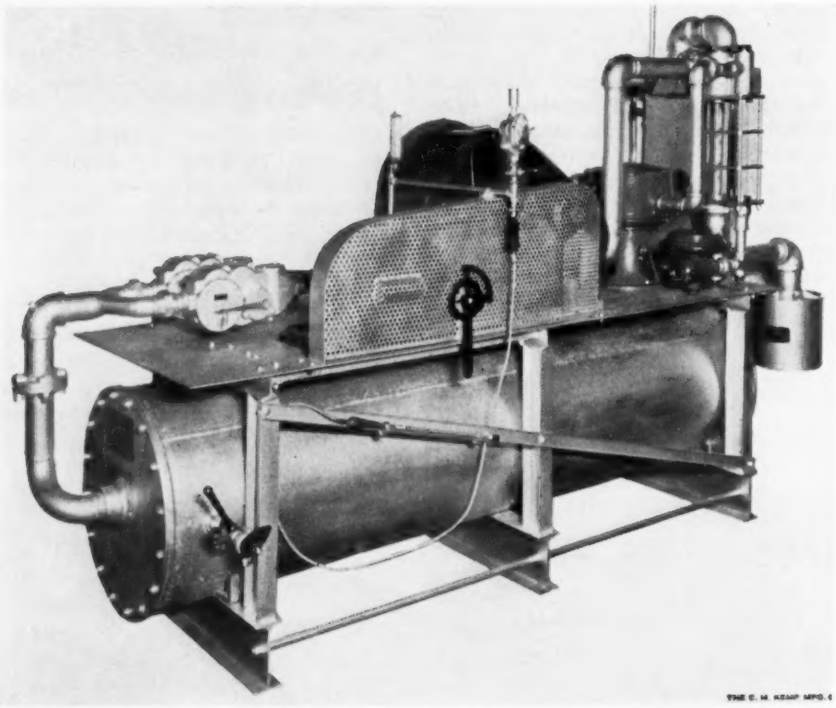
• • •

Lowers Fuel Consumption

Savings in the cost of fuel are promised by a newly developed hydraulic insulating refractory concrete for all types of heat treating furnaces, flues, open-hearth regenerators, stack linings, doors, soaking pit covers, producer and blast furnace gas mains, galvanizing and tin furnaces, etc. Under continuous operation at 2500 degrees Fahr. furnace temperature the expansion or contraction is claimed to be negligible. Because of its low heat storage and low thermal conductivity when poured to form a lining or baffle, the boiler or furnace becomes more sensitive to automatic control, thus effecting a saving in fuel and an increase in output. Gas-fired furnaces lined with the new material are brought to working temperature in one-third the time and operate at about 100 degrees higher temperature than furnaces lined with ordinary fireclay brick. Relining existing furnaces with the new concrete, according to the producer, will pay for the cost of the improvement many times over the first year predicated on the saving in fuel costs.

• • •

Uses Controlled Atmosphere for Annealing Sheets



APPROXIMATELY 6000 cubic feet of gas per hour at 8 inches water column pressure is generated by the recently developed producer shown in the accompanying illustration. The nonoxidizing protective atmosphere is used in an annealing furnace operated by a high-grade sheet producer. The unit utilizes coke oven, artificial or natural gas partially burning it with a predetermined amount of air. The resultant treated and cooled products of combustion, from which water has been eliminated, then is delivered under pressure to the annealing furnace. The unit operates automatically and is equipped with an accurate air-gas proportioning mechanism which affords visible evidence of the air-gas ratio. The atmosphere gas producer was built by the C. M. Kemp Mfg. Co., Baltimore

Favors Long Die Life

Use of higher carbon steels to obtain higher strength and greater hardness necessitates an anneal or a softening heat treatment of the steel before it is drawn into bolt wire, according to an Ohio wiremaker. Research discloses that a uniform coarse grain is highly conducive to efficient cold heading properties and long die life. Instead of normalizing the steel at a temperature just above the critical range and air cooling to obtain a fine, dense grain, the product is annealed well above the critical range and then given a rather slow controlled cooling. This imparts the desired coarse, open structure.

• • •

Will Pour 200-Ton Ingot

What is said to be the largest ingot mold in the world is about to be placed in service by an English steelmaker. The largest steel ingot ever cast in England weighed 175 tons but with the new mold ingots weighing 200 tons or more will be poured for forging purposes. Over 170 tons of molten metal was employed for its construction.

Announcing Korolac

Remarkable New Coating for Plating Racks

Saves current, reduces rejects, makes racks last months instead of days, increases production

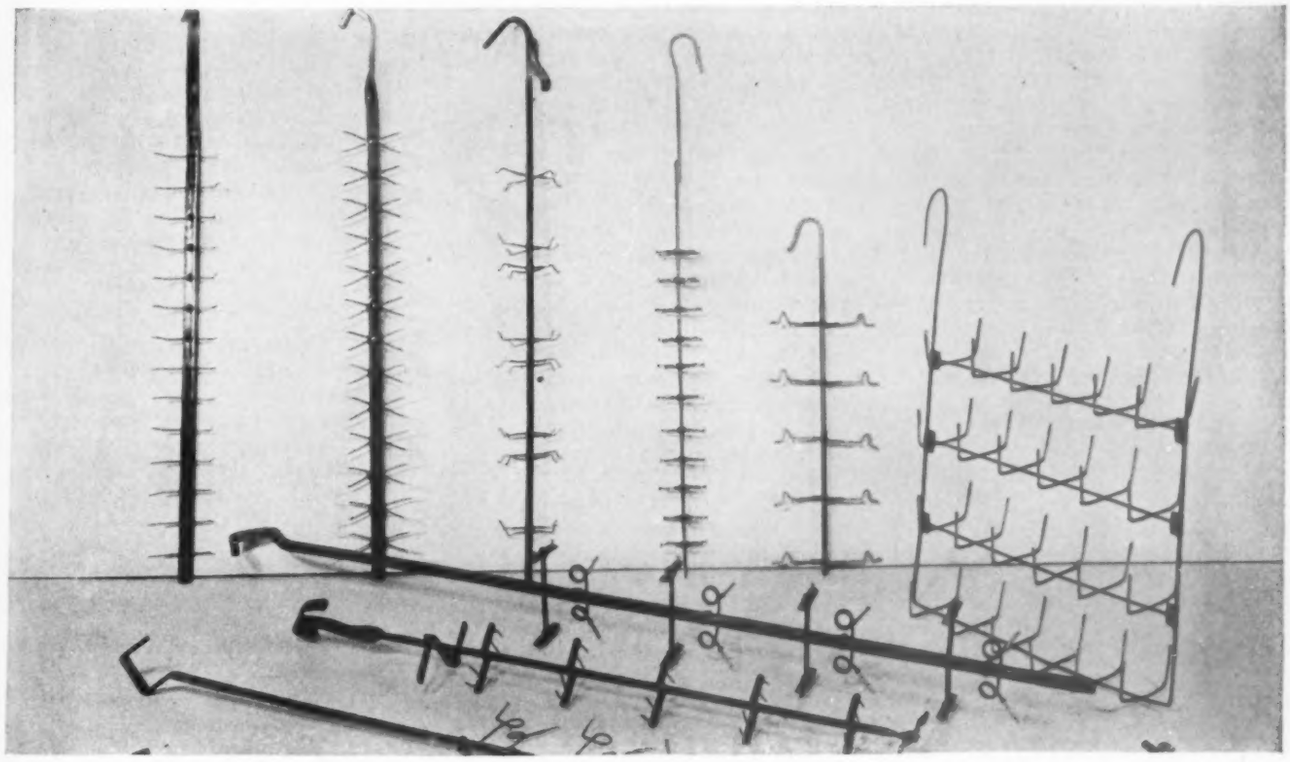
KOROLAC is a new synthetic rubber-like material with which plating racks can be coated in a few hours, in your plant, by dipping. Korolac is translucent, corrosion resistant, tough, inert. It is usable in practically all plating services and so does away with the need for re-racking between plating operations.

Korolac does not crack. Electrical leakage is reduced—in one case already on record the saving was 40%.

Racks covered with Korolac have been in fully satisfactory use for six months in a plant where racks formerly had to be covered with lacquer every day.

Korolac will not contaminate plating solutions. Korolac reduces the investment in racks and cost of recovering. All transportation costs are eliminated as coating is done in your own plant. Korolac has many other remarkable advantages which every plater should know. For prices, samples and specific data, write today to The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

ALL *products problems* IN RUBBER



Goodrich

Symposium Reflects Universal Interest in Low-Alloy, High Yield Strength Steels

LOW-ALLOY high-tensile steels, received major attention at a joint symposium of the Iron and Steel and Institute of Metals divisions of the American Institute of Mining and Metallurgical engineers, held in New York, Feb. 20, during the institute's annual meeting. Not all those steels which have been introduced will survive, it was believed, but some of them, or some still to be developed, will meet the structural requirements of the future. Much attention was given to the differences in composition of the "high-yield" steels and it was felt that as time goes on analyses will show a tendency toward standardization.

One speaker declared that with the advent of high yield strength steels a new epoch has been entered in the field of structural steel. "It would not be surprising," he said, "to see the day when these steels are the regular tonnage steel and when present-day plain carbon steel will be obtainable, should anyone need it, only upon special order."

Several speakers at this session also dealt extensively with the characteristics and uses of the newer, light-weight, nonferrous alloys. Present-day practice in the selection of materials to meet definite and exacting engineering needs was discussed.

Interest Is Universal

H. W. Gillett, chief technical adviser, Battelle Memorial institute, Columbus, O., declared in his noteworthy paper, that although weight-saving design and materials are most widely discussed in respect to their use on railroad equipment, this subject is of universal interest. Reduction of dead load in movable spans and in long spans where most of the required strength is that needed to support the bridge itself long has been sought by bridge engineers. The steamship designer long ago realized the advantage of special materials, while designers of trucks, buses, dragline buckets, dipper sticks for shovels, gantry cranes and many other structures hold similar interest in materials.

Before a metallurgist can develop an alloy he must know what the requirements are, said Dr. Gillett. The first requirement usually is cost. In a steamship, for example, the first cost even of ordinary steel plates is high. Even though 18-8 chrome-nickel stainless steel might make a fine hull, the first cost of 10,000 or 15,000 tons of plates for an ocean liner would be too great. Economic considerations as to first cost limit the choice in many other applications. Whereas hopper cars to carry high-sulphur coal are being built experimentally of 11 per cent chromium stainless steel, with possible economic justification in view of the corrosive leachings from the coal, the use of this expensive material would not be justified in hopper cars for ordinary service.

Design Must Come First

In the formulation of the new steels, he said, it is high yield strength that is sought. The modulus of elasticity and specific gravity of the new steels show no appreciable alterations from those of plain steel. Hence, because stiffness has to be maintained, it is not possible to save half the dead weight by using steel with twice the yield strength of ordinary material. All applications of high-yield steels therefore must be preceded by suitable engineering design.

Starting with the general thesis that a weight reduction of one-fourth to one-third would justify a modification of design, as well as a somewhat higher first cost for materials and a somewhat higher fabricating cost, the problem before the metallurgist falls within certain restrictions. Along with the vital requirement of high yield strength go certain others. The steel must be fabricated with ease, it must be welded easily, it must be tough and workable, and the endurance limit should be high. The steel should show its desirable properties in the as-rolled condition and, at least in the heavier plates, without normalizing, annealing or any other heat treatment. Such treatment, however, Dr. Gillett conceded, might be necessary in the case of thin sheets.

The greatest differences in the various low-alloy steels are reflected in the toughness factor, said Dr. Gillett. Variations from 15 to 30 per cent in elongations per 8 inches and in Izod impact from 25 foot-pounds or below to 75 per cent or above are met. Considering the possible mode of failure of most of the structures involved, it seemed to him doubtful if all the actual toughness factors really required are measured by elongation, reduction in area and impact.

Since the high-yield steels are to be used in smaller cross section than the carbon or the ordinary copper-bearing steels they replace, increased corrosion resistance at least proportional to the decrease in thickness is desirable if the structure is to be exposed to corrosive conditions without adequate protection. While corrosion resistance may not always be required, he said, it is an asset.

Present Trends Defined

Dr. Gillett discussed the compositions of 33 steels which comprise substantially the entire high yield strength family at the present time. From these data, reproduced in the accompanying table, he deduced certain facts and trends underlying the formulation of these steels, as follows:

1. High carbon content is avoided and strength secured by alloying. Formability, weldability and the endurance ratio in general are improved as the carbon goes down.

2. With few exceptions, copper is present at least in the amount found in ordinary copper-bearing steel to give corrosion resistance.

3. There is a considerable group of modern steels in which copper is used as a strength-giving element as well. When the copper goes up much above 0.50 per cent, a small

amount of nickel is added to avoid surface difficulties.

4. Phosphorus, which itself helps to give a high yield ratio, sometimes is used also to enhance the corrosion resistance of copper steel, in which cases the carbon is kept low to retain toughness.

5. The amount of carbon plus phosphorus in these steels shows a marked tendency to be held to the 0.20 to 0.30 per cent range when toughness is essential.

6. High yield ratio seems to be what is sought, and there appears to be a tendency to avoid, rather than to seek, increased tensile strength as long as the desired yield strength is obtained.

High yield ratios are produced, among the lower cost alloying elements, Dr. Gillett continued, by using copper in proportions of 0.75 to 1.4 per cent, silicon 0.75 to 1.25 per cent, or by raising phosphorus to 0.05 to 0.15 per cent. Manganese at 1 to 1.50 per cent, with suitably low carbon content, also may serve. Chromium generally is considered to help materially in getting uniform properties in varying sections, a matter in which manganese and especially silicon are somewhat deficient. The effect of 0.5 to 1 per cent chromium upon corrosion resistance is not clear. Use of any of these elements as the sole strengthening agent besides carbon has drawbacks. To remedy these drawbacks it is customary to build up a more complex steel, always maintaining a sufficient amount of the elements which confer high yield strength and yield ratio to give the minimum desired.

While opinions differ widely as to the most suitable composition of a complex steel, and various permutations and combinations are being advocated and used, Dr. Gillett philosophized that it is not a bad idea to have a good sized litter of kittens from which to select the smartest ones, even if the rest have to be drowned. He concluded with the thought that tests of the high-yield steels should be conducted under the direction of some central body, such as the American Society for Testing Materials. Data resulting from such tests, he felt, would be welcomed by consumers.

RAILROADS eventually will be large purchasers of cars and locomotives again, said J. J. Pelley, president, Association of American Railroads, Washington. They own fewer than 2,000,000 cars today, or between 500,000 and 650,000 fewer than the peak. A gain of 25 per cent in business would put the railroads into the equipment market on a large scale. Despite the fact that the railroads went into the depression with inadequate financial reserves and despite the vast reduction in their volume of earnings, they are showing great recuperative power. Perhaps the greatest danger they now face is the possibility of radical legislation. Mr. Pelley said that enactment of the 6-hour day bill, which would change the basis of regular and overtime pay, the train limit bill which would limit freight trains to 70 cars, and the full crew bill which would require additional men on many classes of trains would increase sharply the present cost of transporting freight. He also declared the railroads continue at a disadvantage in competing against unregulated traffic on the public highways.

The approximately 40 lightweight, streamline, or semilightweight, semi-streamline, passenger trains now in use, said Mr. Pelley, are proving exceedingly popular with the traveling

Properties of Low-Alloy Steels, As Rolled, ¼ to ¾-Inch Plate

	Composition, per cent									Yield strength Lb./In.²	Tensile strength Lb./In.²	Elong. in 8", %	Impact Values at room temperature: Izod, Ft. Lbs.	Impact Values at room temperature: Charpy
	C	Si	Mn	P	Cu	Cr	Ni	Mo	V					
Ordinary Structural Cu-bearing	0.20	—	0.40–0.60	0.04†	0.20	—	—	—	—	25-30,000	50-60,000	25–30		25–35
High-carbon	0.40-0.45	—	0.40–0.60	0.04†						45,000	80-90,000	18–20		15–20
Nickel	0.40-0.45						3.25–3.50			50-60,000	85-100,000	18–20	40	
Mayari	0.40					0.50–0.75	1.25			50,000	85,000	19	—	—
Ni-Mn	0.30	0.30	1.00				2–2.50			65,000	100,000	19	—	—
Nickel	0.20	0.20	0.60	0.04†			2–2.50			55,000	80,000	20–25	65	
Copper (Lorig)	0.10				1.00					55,000	70,000	35* **		
Copper (Nehl)	0.12				0.85					45-50,000	65-68,000	25		
Copper (Brueil)	0.16				1.00					59,000	70,000	26		
Copper (Hayward & Johnston)	0.38				0.85					60,000	70,000	25*		
Copper, pptn.-hardened (Smith & Palmer)	0.10				1.00					80,000	90,000	28*		
Yoloy	0.08				1.00		2.00			55,000	65,000	33*		
	0.22				1.00		2.00			85,000	90-95,000	27*		
	0.24	0.26	0.67	0.05	1.00		2.00			60,000	88,000	27		25
Hi-steel (Inland)	0.10	0.15	0.50	0.10	1.00	—	0.50	—		55-65,000	75-85,000	22		50
Alan-Wood 70-90	0.27	0.01	0.45	0.10	0.45					75,000	90,000	14–20	—	—
Phos. (Hunt)	0.08	0.01	0.48	0.50	—	—				59,000	80,000	23	Very Low	
Phos. (d'Amico)	0.14			0.24			—	—	—	57,000	78,000	22	Low	
Cu-P (Lorig & Krause)	0.07	0.02	0.47	0.26	1.40					65,000	80,000	27*		31
Republic dbl. strength* **	0.23		0.75		1.30	—	0.75	0.16		70,000	90,000	20*	50	
	0.08	—	0.70	—	1.40	—	0.75	0.11		65,000	74,000	31	76	
G.H.H.	0.12–0.25	0.50†	1.00–1.30		0.35			0.15–0.25		—	—	—	—	
Cor-Ten	0.10	0.50–1.00	0.10–0.30	0.10–0.20	0.30–0.50	0.50–1.50	—	—		50-60,000	65-75,000	23	60	
Chromador (Haigh)	0.26	0.11	0.74		0.31	0.93				57,000	92,000	22		
(Roberts)	0.22	—	0.80		0.30	0.90				52,000	85-100,000	17		
Union	0.15	0.25	0.80		0.50–0.60	0.40								
Baustahl	0.12–0.25	0.30–0.50	0.70–1.00		0.60–1.00	0.40–0.60				50-60,000	70-85,000	20–25		
	0.19	0.23	0.86		0.61	0.43								
Cromansil	0.05	0.87	1.12			0.25				54,000	71,000	31	64	
	0.14	0.76	1.24		***	0.47				62,000	91,000	25	—	
	0.21	0.72	1.17			0.47				50,000	92,000	20	36	
Krupp	0.12–0.25	0.30–0.50	1.20–1.60		0.30–0.60					50-60,000	80-85,000	20–28		
Lauchammer	0.12–0.25	0.50–0.70	0.90–1.10		0.50–0.60					(Meets German specifications for Stahl 52)				
Common German steel 52	0.12–0.25	0.80–1.10	0.75–0.90		0.25–0.40					(Meets German specifications for Stahl 52)				
Man-Ten	0.23	0.23	1.40		0.28					65-70,000	88-93,000	19–20		
Jal-Ten	Max. 0.35	0.30	1.25–1.75		0.40 min.					50,000	80,000	20	40	
Sil-Ten	0.40	0.20–0.30	0.70–0.90		0.20					45,000	80-95,000	24		
Delaware river bridge	0.34–0.42	0.22–0.24	0.57–0.58							46,500	83,87,000	20–25		
	0.31	0.29	0.96							52,500	90,500	25		
Mauretania 1907	0.27	1.12	0.72							62,500 67,000	90-105,000	25–30		
Recent U.S. Navy	0.18	0.25	1.45		0.20				0.18	50,000	80,000	20		
Freund (1925)	0.13	1.05	0.57		0.18	0.08				56,500	76,000	25		
Low C-Mn (Lang 1911)	0.10	0.31	1.27		0.15					54,500	71,500	28		

†Maximum *In 2 inch **Normalized ***0.50 per cent copper may also be present.

Subject to author's revision

public and are increasing the business of the roads operating them. He believed that more such trains would be bought in the future but he said he had no means of knowing what materials and designs would prevail. Speaking of the lightweight freight cars which now are being tested in service, he felt that the future use of high-yield steels in freight cars will be better indicated after more data have been compiled from these tests.

W. W. COLPITTS, New York, railroad engineer and director of a number of lines, declared that the lightweight, streamline passenger trains had proved a success from the operating standpoint, but immediate widespread adoption of such equipment will be prevented by financial inability of many railroads to buy it. With regard to the various types of lightweight equipment, experience will have to determine the most suitable from the standpoints of safety, cost and economy of operation.

Weight reductions in trains so far built have ranged from one-third for the semilightweight, carbon steel cars to about two-thirds for the stainless steel or duralumin cars. But the difference in the finished cost is not nearly so noticeable. Cost of the stainless steel going into the Burlington Zephyr was only 7 per cent of the total cost. He believed that railroad men do not care what materials go into their equipment, provided that the equipment is as safe, as fast, as low cost and as pleasing to the public as any.

Mr. Colpitts was optimistic as to the future of the railroads in developing more freight and passenger business but declared that passenger rates must be reduced. A Southern road of which he is a director, since it reduced its passenger rate from 3.6 to 1.5 cents per mile, has increased passengers by 72 per cent.

AN INTERESTING study of the increasing use of aluminum and magnesium and their alloys in the transportation field was presented by Zay Jeffries, consulting metallurgist, Cleveland. He pointed out that an aluminum truck tank of 2400 gallons capacity weighs no more than a 2000-gallon steel tank when full; despite the higher first cost of aluminum, the increased payload per trip soon shows a net saving. Aircraft provide the most intensive use of light metals in transportation; in 1929 an average of 1548 pounds of aluminum was used on each airplane built in the United States. In the first six months of 1935 this has risen to an average of 5356 pounds per plane.

It probably will be sometime, Mr. Jeffries thought, before a final choice is made among the three leading types of lightweight passenger trains now being tried — stainless steel, aluminum alloy sheet with airship type of construction, and aluminum alloy sheet with a more conventional style of construction. Because initial cost is an essential factor in automobile construction, he anticipated that less expensive materials would continue to predominate in that field. In contrast, commercial cars and trucks are being built more extensively with aluminum bodies. Many buses are being provided with aluminum bodies to increase their revenue load capacity. Corrosion resistance as well as weight saving is increasing the use of aluminum in the marine field.

Reviews Bearing Metals

An analysis of the materials specified by designing engineers was presented by C. H. Mathewson, professor of metallurgy, Yale university, New Haven, Conn. His paper, in particular, went into the newer types of bearing metals used in ships, airplanes, automobiles, in steel mills, etc.

Edgar P. Trask, naval architect, New York, who designed the hulls for the 945-foot, 30-knot superliners proposed by United States Lines, discussed the relative merits of substituting high-yield steels and aluminum alloys for mild steel in ship hulls. He presented tabular data showing the factors of safety and the changes in dimensions necessary to produce the same general design characteristics.

Merrill C. Horine, International Motor Truck Corp., New York, said that the use of lighter bodies on trucks and buses results in important fuel savings.

H. C. Knerr discussed developments in the aviation field, particularly the use of aluminum and magnesium.

Study Role of Silica in Embrittlement of Steel

Silica, sharp dust from sand or quartz, injures not only human lung tissue, but penetrates even into steel, the bureau of mines has announced following laboratory tests in its New Brunswick, N. J., experiment station.

Already charged with responsibility for the silicosis disease which sometimes afflicts mineral workers, silica now has been found to be the cause of boiler explosions. In some cases silica has caused steel to become so brittle that it could be cracked by the blow of a hammer. Tests showed that silica, in a solution of sodium hydroxide at high temperature, apparently causes the solution to worm itself along the grain boundaries of the steel.

Embrittlement of steel has baffled chemists for years. For 30 years or more it has been believed to be caused by caustic, but the recent tests show that steel does not become seriously brittle and weak unless silica is present.

Discovery of the part played by silica in weakening of steel does not explain the phenomenon, the bureau states, but it does give investigators a chance to work out chemical processes involved.

Results of the bureau's investigation were presented at the annual meeting of the Iron and Steel division of the A.I.M.M.E.

Steelmaker Trains Workers In Fabricating Division

The fabricating division of the American Rolling Mill Co., Middletown, O., has conducted a training school for its employes with effective results. Most of the members of the division are enrolled in the school which applies the vocational training idea on a broader scale. A full-time leader not only instructs the study groups, but checks work in the plant and gives practical advice for improvement of quality and output.

Requirements are 150 hours of satisfactory classroom work and 2000 hours of practical work in the plant before a man is given a certificate by the Ohio State board of vocational training. In addition to training designed to improve skill, the men are schooled in the practical economics of the business.

Construction Started on Refractory Tunnel Kiln

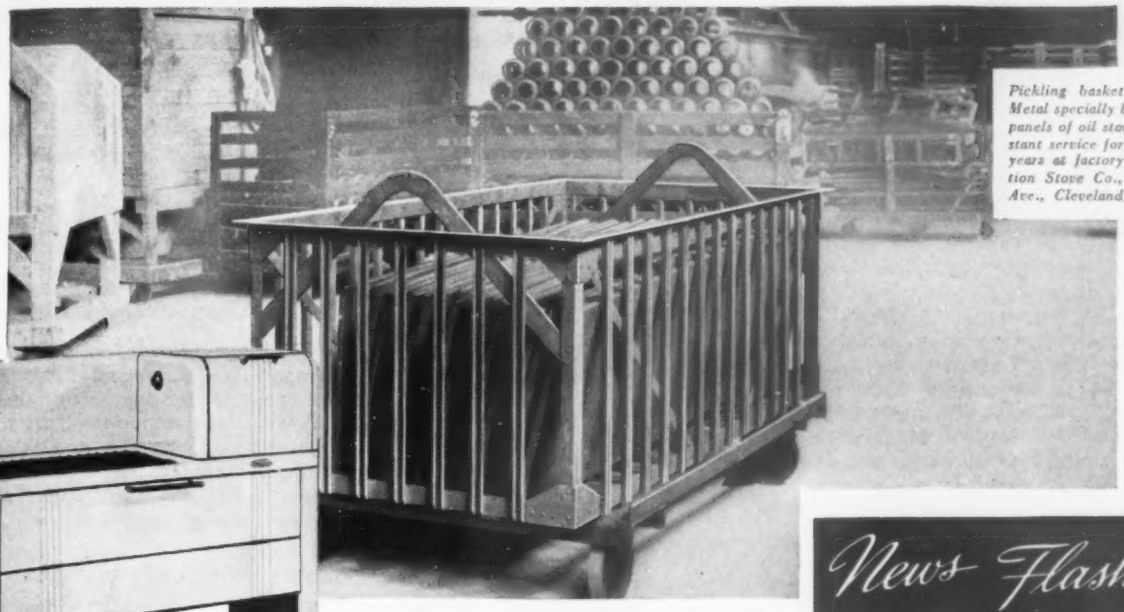
Construction of another tunnel kiln by the A. P. Green Fire Brick Co., Mexico, Mo., was started recently, adding 10,000,000 brick to the company's annual capacity.

The chief feature of this new high-temperature tunnel kiln is flexibility in operation — both in speed and temperature control.

Unlike the four other tunnel kiln units in the Green plant, the new unit will have a continuous furnace section, equivalent to 30 individual furnaces or "fire pockets."

An elaborate system of control instruments in connection with advanced ideas in kiln designing will allow for the recovery of waste heat, which will be used in twin tunnel driers operated in connection with the kiln. These driers are directly in front of the charging end of the kiln, but are separate units.

A *Pickling* Basket
"CUSTOM-MADE"



Pickling basket of Monel Metal specially built to hold panels of oil stoves. In constant service for the last 12 years at factory of Perfection Stove Co., 7609 Platt Ave., Cleveland, Ohio.

An attractive oil stove, this "New Perfection" for 1936. More, it is serviceable and durable. It should be; its makers have carefully treated the materials which go into it. An enamel covering can make any stove look good for a short time. But Perfection want their stoves to last for years. That's why they pickle the panels—in Monel Metal baskets—before they apply the enamel.

Built to do ONE JOB, *it serves* "PERFECTION" *a Dozen Years*

SEE the caption above for one of the "success stories" of MONEL METAL. We hear so many of these true stories that we are apt to take them for granted. But the reasons behind this one are important for YOU.

After 12 years, this pickling basket is still doing well its difficult job . . . *because it was designed for that particular job.*

Manufacturers of special products who do their own pickling make highly specialized demands of pickling baskets. The *shapes* and *sizes* of the parts to be pickled offer such a wide variety that the design of each basket is a law unto itself.

These manufacturers WANT Monel Metal in their pickling baskets, of course. They want it for its great strength with light weight, and for its high resistance to corrosion from sulfuric acid and hydrochloric acid pickles.

That's why they WANT Monel Metal. But they could not USE it unless they could get it in a wide range of mill forms and shapes, and unless it could be fabricated into the kind of baskets best adapted to their pickling.

But Monel Metal *is* available in all the usual mill forms, and in rods, flats, angles and special shapes, in hot-rolled or in cold-drawn or cold-rolled forms. And there is no metal which lends itself more readily to all modes of fabrication: welding, brazing, soldering, forging, drawing and stamping. Monel Metal is machineable as well.

So, when you want to utilize Monel Metal's ruggedness, be assured that the basket you need for *your* special work can be fabricated from Monel Metal.

Write for a booklet containing many successful designs of pickling baskets, "Equipment Designs for the Pickle House." Or write the Inco engineers; they're always glad to share their experience.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET NEW YORK, N. Y.

Monel Metal

News Flashes

HELD FAST AGAINST ACID SPLASH AND DRIP

In the wooden walks around pickling tanks, the cross boards are held fast to the sleepers with Monel Metal nails because of this metal's high resistance to corrosion by the acid that splashes on to the floor. These nails are used also for fastening wooden protecting strips to the acid tanks, and in the roofing construction overhead.

PAPER MILL SERVICE RECORD

A Ni-Resist pump shell in operation in black sulphate liquor at a leading Canadian paper and pulp mill is reported as showing no signs of wear or corrosion after 13 months' service. Before Ni-Resist was adopted, the life of these shells did not exceed six months.

MONEL METAL STIRRUPS

This special equipment is used to protect the sides and bottoms of pickling tanks that do not possess sufficient wear resistance to withstand the continual bumping of loaded crates and baskets. Monel Metal is chosen for this use because of its great strength and corrosion resistance and its ability to stand up under hard usage.

NICKEL PREVENTS LOW TEMPERATURE EMBRITTLEMENT

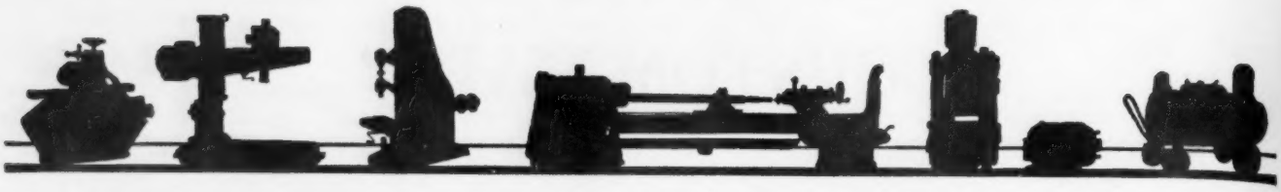
The ability of Nickel Alloys to resist low-temperature embrittlement has led to an increased use of 2 to 3½ Nickel Steels in pressure vessels for the oil refinery de-waxing process.

ZINC CHLORIDE FLUX BOXES

The choice of materials to handle zinc chloride is limited by the corrosiveness of this chemical. This is especially true where the metal to be used must be strong and malleable, as well as resistant to chemical attack. Monel Metal has been found to answer all requirements in connection with such equipment as flux boxes for galvanizing pots and trays for soldering flux. In connection with such uses the metal may have to resist the attack of ammonium chloride and hydrochloric acid, as well as zinc chloride.

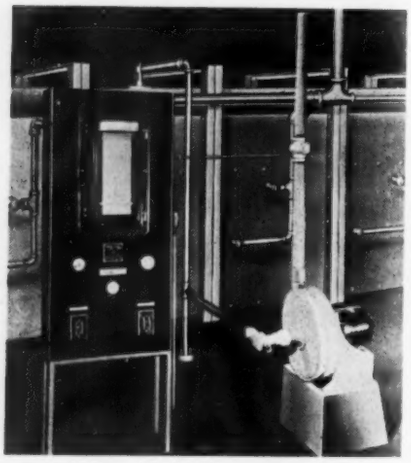
Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

New Equipment



Stationary Gas Analyzer for Reheating Furnaces—

Bacharach Industrial Instrument Co., 7000 Bennett street, Pittsburgh, has supplemented its portable type RZA analyzer with a stationary model. This equipment has been installed on several reheating furnaces and provides the heaters with continuous, direct-reading analysis of the combustion atmosphere at all times. It is announced that the analyzer is suitable for measuring the traces of unburned gases present in neutral combustion atmospheres, or the high unburned gas percentages required in heating full finish sheet products. It also is applicable to bright annealing furnaces.



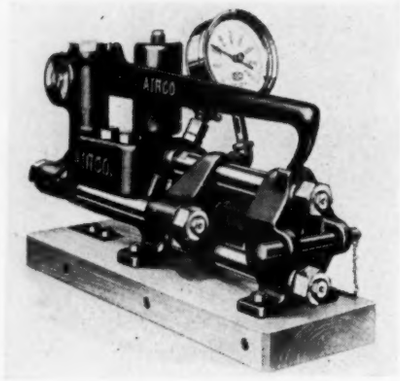
Bacharach stationary RZA panel with recorder on sheet normalizing furnace

The analyzer is rugged, low in maintenance requirements and in every sense a mill instrument. Time lag is reported to be usually less than 20 seconds. The accompanying illustration shows a 251-52 stationary type RZA panel with recorder on a sheet normalizing furnace.

• • •

Portable Tensile and Bend Testing Machine—

Air Reduction Sales Co., Lincoln Bldg., New York, is marketing a portable tensile and bend testing machine. The unit, shown, herewith, meets a demand for a compact and portable testing machine for use on the welding job. With a few strokes of the operating lever after the specimen is set up, the operator can apply a direct load up to 40,000 pounds. By using specimens of smaller cross sectional area than the maximum 1½ by ½-inch, loads equivalent to 150,000 pounds per square inch or higher can be applied, the company claims. On the large, easy-reading gage the operator can watch the load grow. Readings are accurate to plus or minus 2 per cent.



Airco portable machine tests weld specimens on the job

• • •

Automatic Stock Reel—

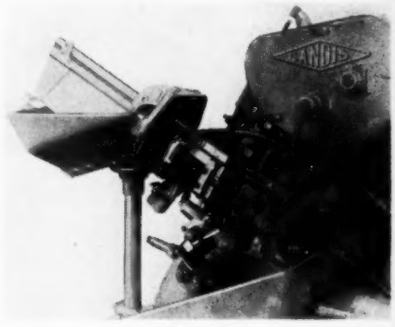
U. S. Tool Co. Inc., Ampere, N. J., recently developed an automatic stock reel for use in plants where metal stamping is done. The device, shown herewith, is motor-driven and employs a simple mechanism that automatically maintains a loop of stock. It is made in vertical and horizontal quick-loading types, and in various sizes and capacities.

U. S. automatic stock reel

• • •

Magazine Feed for Forming And Threading Machine—

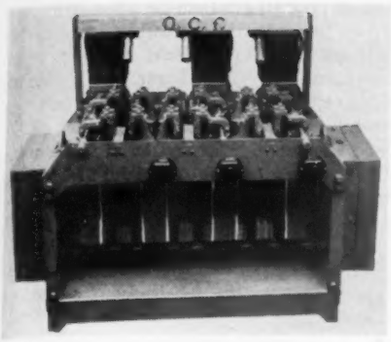
Landis Machine Co. Inc., Waynesboro, Pa., announces that in order to provide for increasing the capacity of its automatic forming and threading machine to take bolts longer than 6 inches a magazine feed has been developed. The arrangement, shown herewith, will handle bolts up to 7¼ inches long, which is the maximum length that can be taken by the transfer mechanism. The installation can be made to machines in service.



Landis automatic forming and threading machine equipped with magazine feed

Bolts must be placed in the feeding chutes of the magazine by hand, after which they are automatically fed to the grippers, pointed, threaded, and ejected. All factors remaining equal (diameter, pitch, thread length, and cutting speed), production will be identical with that of regular machine equipped with hopper leaf for fully automatic feeding.

Capacity range of the magazine feed is up to 2½ inch length of thread on 3/16 to ¾ or 1 inch diameter bolts, from 2½ to 7¼ inches long and with head thickness up to 1¼ inches. The length of the magazine chute is 35 inches from the loading end to the feeding end and



A.C.F. No. 4 three-electrode Berwick metal heater

the number of bolts which it will hold at one time is governed by the size of the bolt heads. For bolts shorter than 6 inches the regular hopper leaf feed should be used.

◆ ◆ ◆

Metal Heater—

American Car & Foundry Co., 30 Church street, New York, is building a No. 4 three-electrode metal heater for heating stock of any diameter from ¼ to 2½ inches, and giving any length heat from 1 to 24 inches, at the end or at any point on any length bar. Shown above, the unit is equipped with electric eyes for controlling the temperature.

◆ ◆ ◆

Cutoff Machine—

Tabor Mfg. Co., 6225 Tacony street, Philadelphia, recently brought out a new cutoff machine, shown herewith. Four types are available. The unit can be obtained with a stationary head, allowing the work to be placed on the table and fed into the wheel by hand. A combination stationary and chopping head features another type, and the use of a traversing head, which is brought forward into the work, permits the work to be clamped securely in position. A travelling table is obtainable to facilitate long cuts. The machine is adapted for use not only in the cutting of gates and risers from castings, but also for cutting bar stock, strip steel, tubing, structural shapes, refractories, etc.

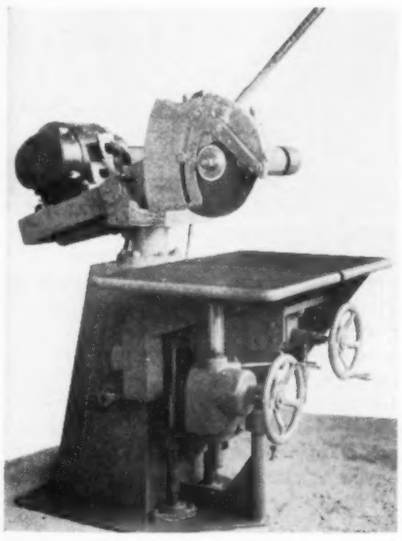


Table of Tabor cutoff machine is easily adjusted for height

◆ ◆ ◆

Portable Electric Polisher—

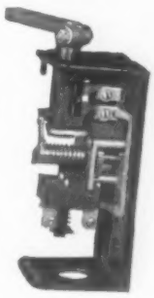
Independent Pneumatic Tool Co. 600 West Jackson boulevard, Chicago, recently introduced a new U-38 portable electric polisher, shown herewith. Features are its light weight, balance and ease of handling. The unit is equipped with a Thor standard motor which can be inspected while running by merely removing the two brush covers. Side handle can be used on either side of the machine to accommodate the operator. Equipment includes a 7-inch flexible rubber pad, a 7-inch felt pad and an 8-inch sheep wool pad.

Thor portable electric polisher

◆ ◆ ◆

Shipper Rod-Operated Master Switch—

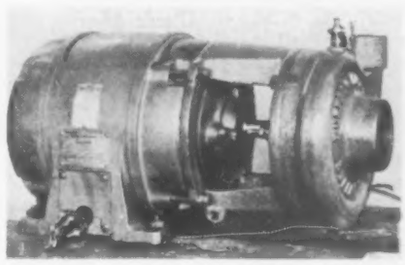
General Electric Co., Schenectady, N. Y., is announcing a new shipper rod-operated master switch that performs the function of a two-button momentary-contact pushbutton station. The device, shown herewith, possesses advantages because its magnetic contactor will pick up and seal-in even when the shipper rod is operated rapidly and will drop out and remain unenergized, in the case of voltage failure, even when the shipper rod does not complete its travel. A short time delay between making and breaking the pick-up circuit is employed, so that this circuit will always be broken after it has once been established, regardless of the position in which the shipper rod is left.



The function of a two-button momentary-contact pushbutton station is performed by this G-E shipper rod-operated master switch

Close Coupled Pumps—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced a line of motors for close coupled pumps. This development was carried on in collaboration with a number of pump builders to produce a motor which would be standard for this application. The particular pump illuustrated herewith is manufactured by Buffalo Pumps Inc. The pump is overhung on the motor frame and the impeller pressed directly on the motor shaft. This design eliminates bearings in the pump, couplings and bedplate. Weight also is reduced and compactness is attained.



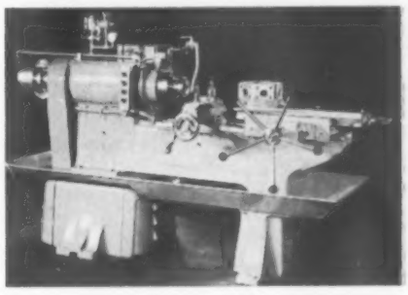
Buffalo close coupled pump with Westinghouse motor

◆ ◆ ◆

High-Speed Turret Lathe—

Gisholt Machine Co., Madison, Wis., recently brought out a simplified high-speed turret lathe. The automatic collet chucking capacity for round, hexagon and square stock is 1½, 1⅜ and 1⅛ inches respectively, and uses either 8, 10 or 12-inch scroll chuck. The machine, shown herewith, has a maximum of 18½-inch swing over the steel topped ways.

An interesting feature of this machine is its drive. Primarily designed for high speed work, all gears and clutches have been omitted from the spindle and headstock. The spindle mounted on tapered roller bearings is driven by vee belts directly from the motor mounted in the cabinet under the headstock. These belts drive an aluminum



Gisholt lathe for large quantity production and small lots

sheave which is mounted on the spindle back of the rear bearing. This sheave can be quickly removed and replaced by another of different diameter, varying the speed in much the same manner as would be done by pickoff gears.

Three different types of hand-operated cross slides are offered and any one may be furnished with or without hand longitudinal adjustment to suit requirements. The three cross slides are lever operated, screw operated or a combination of lever and screw operated. An undercut forming attachment may also be furnished for skiving tools for each cross slide. All three cross slides are provided wtih adjustable stops and with tee slots.

♦ ♦ ♦

Flexible Shaft Grinder—

Stanley Electric Tool Division, New Britain, Conn., is building a flexible shaft portable grinder that develops ⅜ horsepower and a speed of 18,000 revolutions per minute. The unit, shown herewith, can be

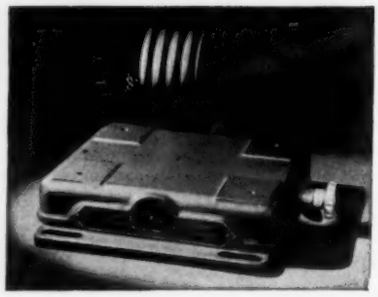
Stanley flexible shaft grinder

employed for external and internal grinding operations on tools, dies, castings, etc. The universal motor provides ample power to drive a 1½ by ½-inch emery wheel. Flexible shaft is 42 inches long and has a heavy reinforced casing with protection springs on each end. Handle piece is equipped with a collet type chuck to hold ¼-inch shanks. The cradle will hold the motor unit on a bench or it can be suspended overhead.

♦ ♦ ♦

Automatic Motor Base—

Allis-Chalmers Mfg. Co., Milwaukee, is offering an automatic ball bearing motor base for use in conjunction with a motion control vari-



Allis-Chalmers automatic motor base

pitch Texrope drive. Four bearings, totally enclosed and lubricated for the life of the unit, support the motor and the upper half of the base. Travel of the device, shown herewith, is in a straight line. A dial indicator enables the operator to maintain correct belt tension at all times. A handwheel on the base controls the speed of the vari-pitch sheave and simultaneously moves the motor a sufficient amount to compensate for the change in centers between shafts, resulting from the variation in the diameter of the sheave.

♦ ♦ ♦

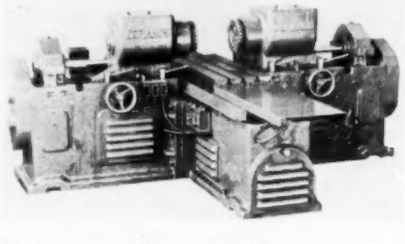
Filter Bags for Anodes—

Hanson-Van Winkle-Munning Co., Matawan, N. J., is marketing filter bags for anodes to keep plating solutions clean. The anode is placed in the filter bag and then suspended in the plating tank in the usual manner. Sludge which ordinarly is released in the solution and which may cause rough and pitted deposits and that which settles to the bottom of the tank remains in the bag. When the anode has been used up, the filter bag is removed from the tank and discarded. Since no sludge gets into the tank the plating solution is kept at maximum efficiency at all times.

♦ ♦ ♦

Milling Machine—

Defiance Machine Works, Defiance, O., has developed a production type horizontal two-way opposed hydraulic feed face milling machine, shown herewith. The unit is designed for simultaneously face milling opposite sides of castings such as compressor housings, engine frames, cylinder



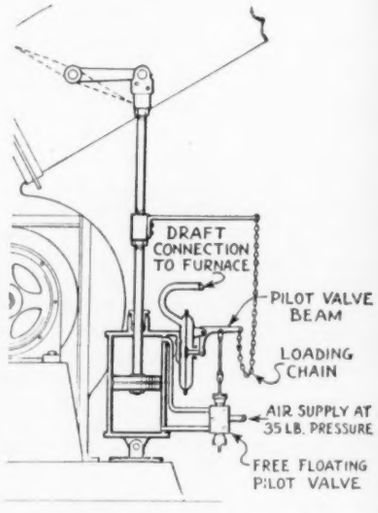
Defiance milling machine embodies hydraulic feed

heads, etc. Hydraulic feed for the table provides an automatic cycle of fast advance, feed and rapid return to stop. By employing additional dogs the cycle can be arranged so as to give a fast advance, feed, skip, feed and rapid return to stop. Working surface of the table is 18 inches wide and 36 inches long. Length of travel is 48 inches. Heads are fully enclosed and force feed lubricated. Maximum distance between spindle noses is 21 inches, a handwheel and screw providing adjustment to give a minimum distance of 11 inches between spindles. Face milling cutters up to 12 inches maximum diameter can be employed on the machine.

♦ ♦ ♦

Furnace Draft Controller—

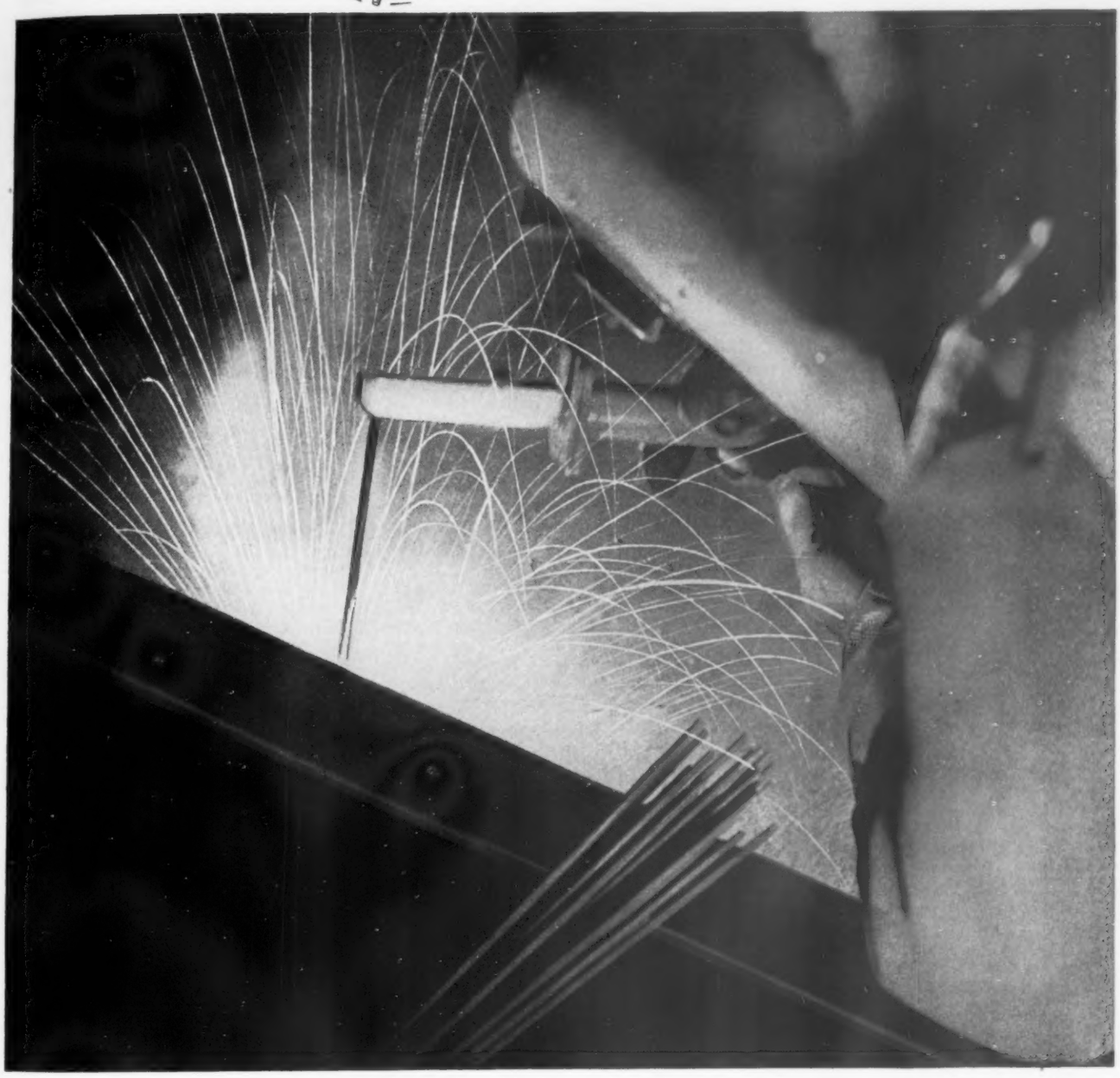
Bailey Meter Co., 1050 Ivanhoe road, Cleveland, has developed a complete self-contained furnace draft controller requiring only a draft connection to the furnace and a supply of compressed air at approximately 35 pounds pressure. As shown in



Bailey furnace draft controller

the diagrammatic illustration herewith, an increase in furnace draft and a corresponding slight movement of the diaphragm to the left, moves the pilot stem downward, admitting pressure under the piston, which in turn moves upward and opens the damper. This movement diminishes the weight of chain supported by the pilot valve beam until the diaphragm force is exactly balanced and the pilot valve is returned to its neutral position. The chain loading device provides a simple and accurate means of applying a counter force against the diaphragm which is finely graduated with the movement of the control drive. The controller may be applied either to the forced draft or the up-take draft as desired.

Roebling — the custom-made wire for exacting welders



A WELDING WIRE absolutely uniform in quality and free of non-metallic impurities . . . made by Roebling's special *custom* methods.

Available for both electric and gas welding, in standard straight lengths or in coils. Write for full information, prices, or samples.

JOHN A. ROEBLING'S SONS CO., TRENTON, N.J.
Branches in Principal Cities

ONLY A FINE PRODUCT MAY BEAR THE NAME ROEBLING

New Trade Publications

Ball Anodes—Udylite Co., Detroit, Mich. A folder on its ball anodes for electroplating, with illustrations showing economy in their use.

Elevators — Warner Elevator Mfg. Co., Cincinnati. Form No. 523 showing operation, construction, use, and advantages of this product.

Trucks—Lewis-Shepard Co., Watertown, Mass. Circular No. 317, devoted to factory and warehouse floor trucks with rubber-tired wheels.

Gear Grinding—Pratt & Whitney Co., Hartford, Conn. Circular No. 420 on its 10-inch hydraulic gear grinder for spur and helical gears, illustrated.

High Tensile Steel—American Rolling Mill Co., Middletown, O. A folder describing Armco H. T. 50, with physical characteristics and results of tests.

Monorail Tractor—American Monorail Co., Cleveland. A bulletin on its monotractor, an electric drive for crane hoist and carrier units, illustrated.

Hydraulic Press—Edwin E. Bartlett Co., Nashua, N. H. Bulletin No. 60, displaying the new No. 60 Greenerd arbor press, with full details concerning structure and applications.

Steel Sheet Piling—Carnegie-Illinois Steel Corp., Pittsburgh. Insert C of its sheet piling book, describing uses of its Z piling; illustrated and with many diagrams.

Electric Furnace—Harold E. Trent Co., 618 North Fifty-fourth street, Philadelphia. An additional page for its looseleaf catalog, featuring its types "B" and "BA" furnaces.

Toncan Iron—Republic Steel Corp., Massillon, O. Advertising form No. 161 points out advantages of this product for air-conditioning equipment, with photographs of specific installations.

Speed Reducer—Foote Bros. Gear & Machine Co., 5301 South Western boulevard, Chicago. Catalog No. 350 on its worm gear speed reducer, including a handbook on worm gears and their evolution.

Tools—Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York. Catalog No. 900 covering a new line of Hicycle tools, with construction details, specifications, and illustrative applications.

Stock List—National Steel Co., 1319-23 Kingsbury street, Chicago. A loose leaf booklet with celluloid indexes, dividing the various steel products, analyses, etc., handled by the company.

Zinc Chromate Primer—Berry Bros., 211 Lieb street, Detroit. Notes and comments on the Berryloid P-27 from leading aircraft manufacturers, stating advantages and uses to which this product has been put in their respective factories.

Lubrication — Texas Co., 135 East Forty-second street, New York. Technical publication No. 12 devoted to selection and use of lubricants, with chief emphasis on this product as a factor in modern sanitary engineering.

Price Lists—Delta-Star Electric Co., 2400 Fulton street, Chicago. List No. 3 concerns price changes in bus bar and conductor fittings, and No. 31-B-1, indoor bus supports from 1500 to 23,000 volts and insulator cable supports.

Portable Electric Tools—Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago. Catalog No. 32 on its line of Thor universal portable electric tools, especially adapted to service shops of the automotive industry.

Valves — Haynes Stellite Co., 205 East Forty-second street, New York. An 8-page booklet, in which the results of application of these valves in high temperature, high pressure steam service, is described, with its features.

Water Meters—Worthington-Gamon Meter Co., Newark, N. J. Bulletin M-975-B31 points out features of the model R, split case type, disk water meter produced by this firm, including dimensions, capacity, parts, and weights.

Multiple-Retort Stoker — Combustion Engineering Co. Inc., 200 Madison avenue, New York. An 8-page bulletin including test data and operating results on the "Design MRO" product of this company, with description of illustrations and construction.

Steel Fabrication—Lukens Steel Co., Coatesville, Pa. Bulletin T-4, pertinent to data accumulated over the past five years with reference to approved methods of fabricating Lukens nickel-clad steel, including welding, design, joining, applications, standards, and heating.

Nickel — International Nickel Co. Inc., 67 Wall street, New York. Volume 13, No. 2, containing in this issue, articles on pioneering in radio tube development, making cast copper-nickel grids, winning an 8-year fight against caustic soda, and other interesting items.

Lubrication—Alemite Corp., 1878 Diversey Parkway, Chicago. An industrial lubrication manual, with illustrated information concerning efficient maintenance of machinery. Recommendations for all types of plants are given, classified according to types of machinery, gears and bearings. Editorial content included.

Screws—American Screw Co., Providence, R. I. A bulletin on recessed head, self centering screws and bolts, with specifications and photographs of wood, machine, and sheet metal screws and stove bolts, listing eight advantages and improvements on these products; the Phillips-utility kit is demonstrated.

Flow Meters—Cochrane Corp., Seventeenth and Allegheny avenue, Philadelphia. A folder on the electric flow meter produced by this firm, informing as to its sensitivity in measurement, operating power, and measuring flow. The latter is given more detailed treatment in Bulletin No. 698, with regard to steam, water, gases, etc.

Testing Apparatus — Precision Scientific Co., 1749 Springfield avenue, Chicago. Catalog No. 160, 80 pages of literature, specifications, and references to governing standards, on petroleum technology with emphasis on testing apparatus for petroleum products. Also contains data on general utility apparatus.

Plant Conditioning — Sherwin-Williams Co., Department IMW-10, Cleveland. Save-Lite catalog, prepared with the co-operation of the better vision institute and the better light-better sight council, a factual presentation of painting as a part of lighting and plant conditioning. Included are various illustrated laboratory studies and industrial applications.

Rotary Converters — Janette Mfg. Co., 556-558 West Monroe street, Chicago. Bulletin 13-I specifies construction details and uses. Prices are shown in bulletin 13-25. Overall dimensions in inches and weights in pounds of converters is included. Bulletin 225 shows some of the other products of the company, including speed reducers, motorized blowers, motors, hydrolators, and oil transfer pumps.

Pumps and Rock Hammers—Worthington Pump & Machinery Corp., Harrison, N. J. Bulletins W-102-B1 and W-1200-B16. The first emphasizes the horizontal duplex piston pumps, type TB, for general services in handling liquids at pressures up to 200 pounds per square inch. The second handles material on the horseshoe valve type rock hammer, wet and dry patterns, inclusive of specifications and applications.

Solder—International Tin Research & Development Council, American office, 149 Broadway, New York. Booklet No. 2, on methods of soft soldering, soldering machines for cans and boxes, its use in the development and manufacture of internal-combustion engine radiators, soldered joints in automatic telephone exchanges, general uses, and bibliography of the process.

Spikes, Pipe, Wire — Bethlehem Steel Co., Bethlehem, Pa. Three folders: No. 346 describes track spikes in all standard sizes to any specification, including tabulated information on extras for size and quantity; No. 345 covers the subject of pipe manufacture from the standpoint of quality; No. 294-A is information on the minimum weight of coating per square foot of bare wire, applications of Bethanized wire, classifications, and extras.

Rise in Seasonal Buying Steadies Steel Rate

Structural, Implement, Tin Plate Orders Heavier; Prices Being Reaffirmed

MARKET IN TABLOID

DEMAND . . . *Strong, except automotive.*

PRICES . . . *More products reaffirmed for second quarter. Scrap higher.*

PRODUCTION . . . *Steelworks operations unchanged at 54½ per cent.*

SHIPMENTS . . . *Heavier.*

SPRING demands for iron and steel are beginning to assert themselves, and shipments have been stimulated by more favorable weather.

Building construction requirements are notably higher, structural shape awards for the week having increased to 33,125 tons. Heavier orders have come from the agricultural implement industry, dealers' sales being the best since 1929. Road machinery builders are working at capacity. Also, of a seasonal character is a rise of 10 points to 75 per cent in tin plate output.

The crest of the wave in railroad buying apparently has passed for the present, while there is as yet no marked improvement in purchasing by automobile manufacturers.

The net result was to continue steelworks operations at 54½ per cent for the third consecutive week. With relatively light support from automobiles, February steel operations averaged 54.1 per cent, within 2 points of last December and November, when assembly of the new models was at its peak. Though lacking as many working days, the industry produced nearly 3,000,000 tons of steel in February, close to January's 3,049,400 tons.

This evidence of broadening demand, in which miscellaneous requirements have played an important part, has made steel producers less apprehensive regarding the delay in important commitments by the automobile industry. Last week's assemblies increased less than 2500 units to 65,000. The output for the month was about 271,800, compared with 380,000 in January, and 335,667 in February last year. A rebound is expected to set in this month. Ford has scheduled 100,000, against 65,000 in February.

Structural projects are multiplying rapidly and give indications of providing a much larger outlet for steel for several months. Included in structural shape awards are 16,000 tons for a mill building at Detroit for Great Lakes Steel Corp., and 7400 tons for government work in the Tennessee valley. Bethlehem Steel Corp. is reported to have booked 8100 tons of plates for a St. Louis water line. Bids have been opened on 6000 tons of steel shelving for the Archives building, Washington.

A large tonnage of steel is being purchased by the railroads for repairs and new cars to be built in their own shops. Norfolk & Western will construct 10,000 steel coal cars, and buy 20,000 tons of rails and five locomotives. Chicago, Milwaukee, St. Paul & Pacific is in the market for 20,000 tons of rails. Northern Pacific has ordered 17,000 tons of rails and about 5000 tons of tie plates; Western Pacific, 10,000 tons of track fastenings.

This week most of the finished steel prices are expected to be reaffirmed for second quarter. Bolts, nuts and rivets already have been extended, as has pig iron. Sheet and strip producers have been delaying announcement pending effort to strengthen the market.

Despite an easier shipping situation, scrap prices have continued to rise. The broadest advance since the winter of 1929-30 is noted at Pittsburgh, No. 1 melting steel selling at $15.50 to $16, and railroad grades $16.50 to $17.

STEEL's London cable reports growing scarcity of pig iron and finished steel in Great Britain, with further price advances. Great Britain opposes shipment of chrome ore from its possessions to Italy, but 1000 tons received at Philadelphia recently from British India has been reshipped by the importer to an Italian port.

Chicago district steelworks last week advanced 3 points to 62 per cent; eastern Pennsylvania ½-point to 37½ per cent; Cincinnati 4 to 76. Wheeling was down 6 to 78; Pittsburgh 1 to 38; New England 3 to 72; Youngstown 2 to 63; and others unchanged.

STEEL's iron and steel price composite is up 5 cents to $33.59; the finished steel index unchanged at $53.70, and the scrap composite up 16 cents to $14.46.

COMPOSITE MARKET AVERAGES

	Feb. 29	Feb. 22	Feb 15	One Month Ago Jan., 1936	Three Months Ago Nov., 1935	One Year Ago Feb., 1935	Five Years Ago Feb., 1931
Iron and Steel	$33.59	$33.54	$33.45	$33.34	$33.15	$32.54	$31.64
Finished Steel	53.70	53.70	53.70	53.70	53.70	54.00	49.42
Steelworks Scrap	14.46	14.29	13.71	13.15	12.92	11.66	10.39

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Feb. 29, 1936	Jan., 1936	Nov., 1935	Feb., 1935
Steel bars, Pittsburgh	1.85c	1.85	1.85	1.80
Steel bars, Chicago	1.90	1.90	1.90	1.85
Steel bars, Philadelphia	2.16	2.16	2.16	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, galv., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.50	2.50	2.50	2.50
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box Pitts.	5.25	5.25	5.25	5.25
Wire nails Pitts.	2.40	2.40	2.40	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$30.00	30.00	29.50	28.00
Sheet bars, open-hearth, Pitts.	30.00	30.00	29.50	28.00
Billets, open-hearth, Pittsburgh	29.00	29.00	28.50	27.00
Wire rods, Pittsburgh	40.00	29.00	38.00	38.00

Pig Iron

	Feb. 29, 1936	Jan., 1936	Nov., 1935	Feb., 1935
Bessemer, del. Pittsburgh	$20.8132	20.8132	20.8132	19.76
Basic, Valley	19.00	19.00	19.00	18.00
Basic, eastern, del. eastern Pa.	20.8132	20.8132	20.8132	19.76
No. 2 fdry., del. Pittsburgh	20.3132	20.3132	20.3132	19.26
No. 2 fdry., Chicago	19.50	19.50	19.50	18.50
Southern No. 2, Birmingham	15.50	15.50	14.75	14.50
Southern No. 2, del. Cincinnati	20.2007	20.2007	20.2007	19.13
No. 2X eastern, del. Phila.	21.6882	21.6882	21.6882	20.63
Malleable, Valley	19.50	19.50	19.50	18.50
Malleable, Chicago	19.50	19.50	19.50	18.50
Lake Sup. charcoal, del. Chi.	25.2528	25.2528	25.2528	24.04
Ferromanganese, del. Pitts.	80.13	90.13	90.13	89.79
Gray forge, del. Pittsburgh	19.6741	19.67	19.67	18.63

Scrap

Heavy melting steel, Pittsburgh	$15.75	14.50	13.65	13.25
Heavy melt. steel, No. 2, east Pa.	12.50	11.37½	11.00	10.15
Heavy melting steel, Chicago	14.75	13.40	13.20	11.65
Rails for rolling, Chicago	15.75	14.25	14.30	12.55
Railroad steel specialties, Chicago	16.25	14.40	13.75	12.50

Coke

Connellsville, furnace, ovens	$3.50	3.50	3.55	3.60
Connellsville, foundry, ovens	4.25	4.00	4.35	4.60
Chicago, by-product foundry, del.	9.75	9.75	9.75	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.70c-1.85c
Gary	1.95c
Chicago, delivered	1.98c
Detroit, del.	1.90c
New York, del.	2.05c-2.20c
Philadelphia, del.	2.01c-2.16c
Birmingham	2.00c
St. Louis, del.	2.18c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.25c-2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.45c
New York, del.	2.60c-2.75c
Philadelphia, del.	2.56c-2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
*Philadelphia, del.	3.21c-3.41c
*New York, del.	3.25c-3.45c
Birmingham	3.25c
St. Louis, del.	3.43c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.35c-2.50c
Gary	2.60c
Detroit, delivered	2.55c
Philadelphia, del.	2.66c-2.81c
New York, del.	2.70c-2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.80c-2.95c
Gary	3.05c
Detroit, delivered	3.00c
Philadelphia, del.	3.11c-3.26c
New York, del.	3.15c-3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base (box) Pittsburgh	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.08c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

(Base, 5 to 25 tons)

Pittsburgh	1.85c
Chicago or Gary	1.90c
Duluth	2.00c
Birmingham	2.00c
Cleveland	1.90c
Buffalo	1.95c
*Detroit, delivered	2.00c
Pacific ports, f.o.b. cars, dock	2.40c
Philadelphia, del.	2.16c
Boston, delivered	2.27c
New York, del.	2.20c
Pitts., forg. qual.	2.10c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	2.06c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	1.95c-2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. car docks	2.45c
Philadelphia, del.	2.11c-2.16c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; less carloads $4 higher; less carloads fencing $5 over base column.)

Base Pitts.-Cleve. 100 lb. keg.	
Stand. wire nails	$2.30- 2.40
Cement c't'd nails	2.30- 2.40
Galv. nails, 15 gage and coarser	4.30- 4.40
do. finer than 15 ga.	4.80- 4.90

(Per pound)

Polished staples	3.00c-3.16c
Galv. fence staples	3.25c-3.35c
Barbed wire, galv.	2.70c-2.80c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$61.00

To Manufacturing Trade

Plain wire, 6-9 gage	2.30c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring, wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Gary, Ind., Cleve., Chi., up 5c Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massilon, Canton, Bethlehem 2.45c

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni 1.05
5100 0.80-1.10 Cr 0.45
5100 Cr. spring ..... base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon Van. 0.95
9250 ..... carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23⅛-in. Pittsburgh	1.70c-1.85c
Chicago or Gary	1.95c
Birmingham base	2.00c
Detroit, del.	1.90c
Philadelphia, del.	2.01c-2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold strip, Pitts. Cleveland	2.45c-2.60c
Detroit, del.	2.65c
*Worcester, Mass.	2.65c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 20-45 lbs.	$28.00
45-50 lbs.	$25.00
50-60 lbs.	$26.00
70-75 lbs.	$24.50
80-90 lbs.	$26.00
100 lbs.	$27.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll, qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.60c
Track bolts, base	3.60c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $2; 16 and 20 lbs., up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage and Machine

½ x 6 and smaller	70-10-5 off
Do. larger	70-10 off
Tire bolts	55 off

Plow Bolts

All sizes	70-10 off

Stove Bolts

In packages with nuts attached 72½-10 off; in packages with nuts separate 72½-10-5 off; in bulk 82½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	65-5 off
Elevator bolts	65-5 off

Nuts

S. A. E. semifinished hex.: ½ to ⅞-inch	60-20-15 off
Do., ½ to 1-inch	60-20-15 off
Do., over 1-inch	60-20-15 off

Hexagon Cap Screws

Milled	80-10-10 off
Upset, 1-in., smaller	85 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila. to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more, no discount on size extras	$3.05
Do., under 5 kegs; no disc. on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

In.	Blk.	Galv.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.			
Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935, card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east. fdy.	43.00
Do., 4 in.	46.00

Class A pipe $3 over Class B
Stnd. fitgs., Birm. base | $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., Buffalo & Youngstown	$29.00
Philadelphia	34.67
Duluth	31.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	30.00

Slabs

Pitts., Chi., Cleve., Young.	29.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	40.00
Chicago	41.00
Worcester, Mass.	42.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.80c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.50- 3.65
Connellsville, fdry.	4.25
Connel, prem. fdry.	5.50
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.70-10.15
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del.	11.50
St. Louis, del.	10.00-10.50
Birmingham, ovens	6.50
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	9.75
Buffalo, ovens	7.50- 8.00
Detroit, ov., out. del	9.00
Philadelphia, del.	9.38

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol	18.00c	
Toluol	30.00c	
Solvent naphtha	30.00c	
Industrial xylol	30.00c	

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	6.75c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.25

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry	Malle-able	Basic	Besse-mer
Bethlehem, Pa.	$20.50	$21.00	$20.00	$21.50
Birdsboro, Pa.	20.50	21.00	20.00	21.50
Birmingham, Ala., southern del.	15.50	15.50	14.50	21.00
Buffalo	19.50	20.00	18.50	20.50
Chicago	19.50	19.50	19.00	20.00
Cleveland	19.50	19.50	19.00	20.00
Detroit	19.50	19.50	19.00	20.00
Duluth	20.00	20.00	.....	20.50
Erie, Pa.	19.50	20.00	19.00	20.50
Everett, Mass.	20.50	21.00	20.00	21.50
Hamilton, O.	19.50	19.50	19.00	.....
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	19.50	19.50	19.00	20.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	19.50	19.50	19.00	20.00
Sparrows Point, Md.	20.50	.....	20.00	.....
Swedeland, Pa.	20.50	21.00	20.00	21.50
Toledo, O.	19.50	19.50	19.00	20.00
Youngstown, O.	19.50	19.50	19.00	20.00
Delivered from Basing Points:				
Akron, O., from Cleveland	20.76	20.76	26.26	21.26
Baltimore from Birmingham	21.08	.....	19.96	.....
Boston from Birmingham	20.62	.....	20.50	.....
Boston from Everett, Mass.	21.00	21.50	20.50	22.00
Boston from Buffalo	21.00	21.50	20.50	22.00
Brooklyn, N. Y., from Bethlehem	22.93	23.43	.....	.....
Brooklyn, N. Y., from Bmghm.	22.50	.....	.....	.....
Canton, O., from Cleveland	20.76	20.76	20.26	21.26
Chicago from Birmingham	†19.72	.....	19.60	.....
Cincinnati from Hamilton, O.	20.58	20.58	20.08	.....
Cincinnati from Birmingham	20.20	.....	19.20	.....
Cleveland from Birmingham	19.62	.....	19.12	.....
Indianapolis from Hamilton, O.	21.93	21.93	21.43	22.43
Mansfield, O., from Toledo, O.	21.26	21.26	20.76	21.76
Milwaukee from Chicago	20.57	20.57	20.07	21.07
Muskegon, Mich., from Chicago Toledo or Detroit	22.60	22.60	22.10	23.10
Newark, N. J., from Birmingham	21.61	.....	.....	.....
Newark, N. J., from Bethlehem	21.99	22.49	.....	.....
Philadelphia from Birmingham	20.93	.....	20.81	.....
Philadelphia from Swedeland, Pa.	21.31	21.81	20.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	21.75	21.75	21.25	21.25

Delivered from Basing Points:	No. 2 Fdry	Malle-able	Basic	Besse-mer
St. Louis, northern	20.00	20.00	19.50	.....
St. Louis from Birmingham	†19.62	.....	19.50	.....
St. Paul from Duluth	21.94	21.94	.....	22.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $24.00, Phila. base, standard and copper bearing, $25.13.

Gray Forge		Charcoal	
Valley furnace	19.00	Lake Superior fur.	$22.00
Pitts. dist. fur.	19.00	Do., del. Chicago	25.25
		Lylees, Tenn.	22.50

Silvery†

Jackson county, O., base; 6-6.50 per cent $22.75; 6.51-7—$23.25; 7-7.50—$23.75; 7.51-8—$24.25; 8-8.50—$24.75; 8.51-9—$25.25; 9-9.50—$25.75. Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon. 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality

Pa., Ill., Md., Mo., Ky.	$45.00
Alabama, Ga.,	$38.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Ga., Ala.	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	48.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	45.00
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$20.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all-rail	$17.50
Do., for barge	$17.50

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	75.00
Do., Balti., base	75.00
Do., del. Pittsb'gh	80.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carb.	85.00
2% carbon, 90.00; 1%,	100.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont.	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: N. Y.	Lead: East St. L.	Zinc: St. L.	Alumi-num 99%	Antimony: Chinese Spot, N. Y.	Nickel Cath-odes
Feb. 22—Holiday											
Feb. 24	9.25	9.37½	8.95	47.50	46.12½	4.50	4.35	4.85	*19.00	13.25	35.00
Feb. 25	9.25	9.37½	8.95	47.62½	46.12½	4.50	4.35	4.90	*19.00	13.25	35.00
Feb. 26	9.25	9.37½	8.95	47.87½	46.37½	4.55	4.40	4.90	*19.00	13.25	35.00
Feb. 27	9.25	9.37½	8.95	48.85	47.00	4.60	4.45	4.90	*19.00	13.25	35.00
Feb. 28	9.25	9.37½	8.95	48.37½	46.62½	4.60	4.45	4.90	*19.00	13.25	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	14.62½
Copper hot rolled	16.50
Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	16.87½
Seamless copper	17.00
Rods	
High yellow brass	13.12½
Copper, hot rolled	13.50
Anodes	
Copper untrimmed	14.00
Wire	
Yellow brass (high)	15.12½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	5.87½-6.12½
Cleveland	6.50- 6.75
Chicago	6.12½-6.37½
*St. Louis	6.00- 6.50
Heavy Copper and Wire	
New York, No. 1	7.37½-7.62½
Chicago, No. 1	7.12½-7.62½
*Cleveland	7.00- 7.25
*St. Louis, No. 1	7.25- 7.75
Composition Brass Borings	
*New York	6.12½- 6.25
Light Copper	
*New York	5.37½-5.62½
Chicago	5.62½-6.12½
Cleveland	6.00- 6.25
*St. Louis	5.75- 6.25
Light Brass	
Chicago	3.62½-3.87½
Cleveland	3.25- 3.50
*St. Louis	3.50- 4.00
Lead	
New York	3.50- 3.75
Cleveland	3.50- 3.75
Chicago	3.37½-3.62½
St. Louis	3.25- 3.75
Zinc	
New York	2.00- 2.25
Cleveland	2.50- 2.75
St. Louis	2.50- 3.00
Aluminum	
Borings, Cleveland	9.00- 9.50
Mixed, cast, Cleve.	13.00-13.25
Mixed, cast, St. L.	12.50-12.75
Clips, soft, Cleve.	15.00-15.25

SECONDARY METALS

Brass ingot, 85-5-5-5	9.50
Stand. No. 12 alum.	16.75-17.25

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	10.00-11.00
Boston, dock, expt.	10.50-10.75
Boston, domestic	9.00
Buffalo, No. 1	12.75-13.25
Buffalo, No. 2	11.75-12.25
Chicago, No. 1	14.50-15.00
Cleveland, No. 1	15.00-15.50
Cleveland, No. 2	14.00-14.50
Detroit, No. 1	11.75-12.25
Detroit, No. 2	11.00-11.50
Eastern Pa., No. 1	13.50-14.00
Eastern Pa., No. 2	12.50
Federal, Ill.	11.50-12.00
Granite City, R. R.	12.50-13.00
Granite City, No. 2	10.75-11.25
N. Y., deal. No. 2	8.50- 9.00
N. Y., deal. barge (No. 1 for export)	9.50
Pitts., No. 1 (R. R.)	16.25-16.75
Pitts., No. 1 (dlr.)	15.50-16.00
Pittsburgh, No. 2	14.25-14.75
St. Louis	11.50-12.00
Toronto, dealers	7.50
Valleys, No. 1	16.00-16.50

COMPRESSED SHEETS

Buffalo, dealers	11.75-12.25
Chicago, factory	13.25-13.75
Chicago, dealer	12.25-12.75
Cleveland	14.75-15.25
Detroit	12.25-12.75
E. Pa., new mat.	13.00-13.50
Pittsburgh	15.50-16.00
St. Louis	9.50-10.00
Valleys	15.25-15.75

BUNDLED SHEETS

Buffalo	10.75-11.25
Cincinnati, del.	8.50- 9.00
Cleveland	11.00-11.50
Pittsburgh	14.25-14.75
St. Louis	8.50- 9.00
Toronto, dealers	4.50

SHEET CLIPPINGS, LOOSE

Chicago	10.00-10.50
Cincinnati	8.50- 9.00
Detroit	9.00- 9.50
St. Louis	7.00- 7.50

STEEL RAILS, SHORT

Birmingham	12.50-13.00
Buffalo	15.25-15.75
Chicago (3 ft.)	16.00-16.50
Chicago (2 ft.)	17.00-17.50
Cincinnati, del.	14.50-15.00
Detroit	14.50-15.00
Pitts., open-hearth, 3 ft. and less	17.25-17.75
St. Louis, 2 ft. & less	14.25-14.75

STEEL RAILS, SCRAP

Boston	9.00
Chicago	14.50-15.00
Pittsburgh	16.25-16.75
St. Louis	13.25-13.75
Buffalo	13.00-13.50
Toronto, dealers	8.50

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	6.00- 6.25
Buffalo	11.00-11.50
Chicago	8.50- 9.00
Cincinnati, dealers	8.00- 8.50
Detroit, net	9.00- 9.50
Eastern Pa.	11.00-11.50
N. Y., deal. fdry.	6.50- 7.00
St. Louis	7.50- 8.00
Toronto, dealers, net	5.50

COUPLERS, SPRINGS

Buffalo	14.75-15.25
Chicago, springs	16.00-16.50
Eastern Pa.	16.50-17.00
Pittsburgh	17.25-17.75
St. Louis	13.50-14.00

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	14.00-14.50
Buffalo	14.50-15.00

RAILROAD SPECIALTIES

Chicago	16.00-16.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	15.00-15.50
Cleveland, billet, bloom crops	17.50-18.00
Eastern Pa., crops	16.50-17.00
Pittsburgh, billet, bloom crops	17.75-18.25
Pittsburgh, sheet bar crops	17.25-17.75

FROGS, SWITCHES

Chicago	14.50-15.00
St. Louis, cut	12.25-12.75

SHOVELING STEEL

Chicago	14.50-15.00
Federal, Ill.	11.50-12.00
Granite City, Ill.	10.75-11.25
Toronto, dealers	6.50

RAILROAD WROUGHT

Birmingham	7.50- 8.00
Boston, dealers	7.00- 7.25
Buffalo, No. 1	11.75-12.25
Buffalo, No. 2	12.75-13.25
Chicago, No. 1, net	13.00-13.50
Chicago, No. 2	14.50-15.00
Cincinnati, No. 2	11.50-12.00
Eastern Pa.	14.00
St. Louis, No. 1	11.00-11.50
St. Louis, No. 2	12.50-13.00
Toronto, No. 1. dlr.	7.00

SPECIFICATION PIPE

Eastern Pa.	11.50
New York, dealers	8.00- 8.50

BUSHELING

Buffalo, No. 1	11.75-12.25
Chicago, No. 1	13.00-13.50
Cinci., No. 1, deal.	8.50- 9.00
Cincinnati, No. 2	5.50- 6.00
Cleveland, No. 2	9.00- 9.50
Detroit, No. 1, new	11.25-11.75
Valleys, new, No. 1	15.25-15.75
Toronto, dealers	6.00

MACHINE TURNINGS

Birmingham	6.00- 7.00
Boston, dealers	4.00- 4.25
Buffalo	7.00- 7.50
Chicago	6.50- 7.00
Cincinnati, dealers	6.50- 7.00
Cleveland	8.50- 9.00
Detroit	7.00- 7.50
Eastern Pa.	8.00- 8.50
New York, dealers	4.00- 4.50
Pittsburgh	10.50-11.00
St. Louis	4.50- 5.00
Toronto, dealers	4.00
Valleys	11.50-12.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.00- 3.25
Buffalo	8.25- 8.75
Cincinnati, dealers	6.00- 6.50
Cleveland	9.00- 9.50
Detroit	7.50- 8.00
Eastern Pa.	6.50
New York, dealers	3.25- 3.75
Pittsburgh	8.50- 9.25
Toronto, dealers	4.00

CAST IRON BORINGS

Birmingham, plain	5.00- 6.00
Boston, chemical	6.50- 7.00
Boston, dealers	3.50- 4.00
Buffalo	8.25- 8.75
Chicago	7.50- 8.00
Cincinnati, dealers	6.00- 6.50
Cleveland	9.00- 9.50
Detroit	7.50- 8.00
E. Pa., chemical	11.00-13.00
New York, dealers	3.50- 4.00
St. Louis	4.50- 5.00
Toronto, dealers	5.00

PIPE AND FLUES

Cincinnati, dealers	8.00- 8.50
Chicago, net	8.50- 9.00

RAILROAD GRATE BARS

Buffalo	10.25-10.75
Chicago, net	9.00- 9.50
Cincinnati	7.00- 7.50
Eastern Pa.	11.00-11.50
New York, dealers	6.50- 7.00
St. Louis	7.50- 8.00

FORGE FLASHINGS

Boston, dealers	7.75- 8.00
Buffalo	11.75-12.25
Cleveland	13.50-14.00
Detroit	10.50-11.00
Pittsburgh	14.25-14.75

FORGE SCRAP

Boston, dealers	6.00- 7.00
Chicago, heavy	16.00-16.50
Eastern Pa.	12.00-12.50

ARCH BARS, TRANSOMS

St. Louis	13.00-13.50

AXLE TURNINGS

Boston, dealers	3.75- 4.25
Buffalo	10.50-11.00
Chicago, elec. fur.	14.00-14.50
Eastern Pa.	11.50
St. Louis	9.00- 9.50
Toronto	4.50

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point	11.00-11.25
Buffalo	15.25-15.75
Chicago, net	15.50-16.00
Eastern Pa.	17.00
St. Louis	13.50-14.00
Toronto	8.50

SHAFTING

Boston, ship. point	13.25-13.50
Eastern Pa.	19.00
New York, dealers	13.75-14.25
St. Louis	13.00-13.50

CAR WHEELS

Birmingham	10.00-11.00
Boston, iron deal.	7.75- 8.00
Buffalo, iron	12.75-13.25
Buffalo, steel	15.25-15.75
Chicago, iron	14.50-15.00
Chicago, rolled steel	15.50-16.00
Cincinnati, iron	11.50-12.00
Eastern Pa., iron	14.50-15.00
Eastern Pa., steel	16.50-17.00
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	17.25-17.75
St. Louis, iron	11.50-12.00
St. Louis, steel	13.25-13.75
Toronto, net	8.50

NO. 1 CAST SCRAP

Birmingham	11.00-12.00
Boston, No. 1 mach.	9.00- 9.25
Boston, No. 2	8.75- 9.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	12.50-13.00
Buffalo, mach.	13.50-14.00
Chicago, agri. net	10.50-11.00
Chicago, auto	11.50-12.00
Chicago, mach. net	12.50-13.00
Chicago, railr'd net	11.50-12.00
Cinci., mach. cup	11.00-11.50
Cleveland, mach.	16.00-16.50
Detroit, auto, net	12.50-13.00
Eastern Pa., cupola	13.50-14.00
E. Pa., mixed yard	12.00-12.50
Pittsburgh, cupola	14.00-14.50
San Francisco, del.	13.50-14.00
Seattle	7.50- 9.00
St. Louis, No. 1	11.25-11.75
St. L., No. 1 mach.	12.50-13.00
Toronto, No. 1, mach., net	9.00

HEAVY CAST

Boston, del.	8.00- 8.25
Buffalo, break.	11.00-11.50
Cleveland, break	12.50-13.00
Detroit, No. 1 mach. net	12.50-13.00
Detroit, break.	11.00-11.50
Detroit, auto net	12.50-13.00
Eastern Pa.	13.00-13.50
N. Y., break. deal.	9.25- 9.50
Pittsburgh	13.00-13.50

MALLEABLE

Birmingham, R. R.	11.50-12.50
Boston, consum.	15.00-16.00
Buffalo	15.75-16.25
Chicago, R. R.	17.00-18.00
Cincinnati, agri. del.	13.00-13.50
Cleveland, rail	17.75-18.00
Detroit, auto, net	14.50-15.00
Eastern Pa., R.R.	16.50-17.00
Pittsburgh, rail	18.25-18.75
St. Louis, R. R.	14.25-14.75
Toronto, net	7.00

RAILS FOR ROLLING

5 feet and over

Birmingham	11.50-12.00
Boston, dealers	9.00
Buffalo	13.00-13.50
Chicago	15.50-16.00
Eastern Pa.	14.00-14.50
New York, dealer	9.75-10.25
St. Louis	14.25-14.75

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	12.00-12.50

LOW PHOS. PUNCHINGS

Buffalo	15.00-15.50
Chicago	16.00-16.50
Eastern Pa.	16.00-16.50
Pittsburgh (heavy)	17.25-17.75
Pittsburgh (light)	16.50-17.00

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.50
No. Afr. low phos.	10.50
Swedish basic, 65%	9.50
Swedish low phos.	10.50
Spanish No. Africa basic, 50 to 60%	10.50
Tungsten, spot sh. ton unit, duty pd.	$15.85-16.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.25

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots

Caucasian, 52-55%	26.00
So. African, 52%	26.50
So. Afr., 49-51%	25.50
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	3.00c
Boston††	3.10c
Buffalo	3.00c
Chattanooga	3.36c
Chicago (j)	3.00c
Cincinnati	3.22c
Cleveland	3.00c
Detroit	3.09c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.11c-3.26c
New Orleans	3.35c
New York‡ (d)	3.31c
Pitts. (h)	2.95c-3.10c
Philadelphia*	3.03c
Portland	3.50c
San Francisco	3.25c
Seattle	3.70c
St. Louis	3.25c
St. Paul	3.25c-3.40c
Tulsa	3.25c

IRON BARS

Portland	3.40c
Chattanooga	3.36c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.22c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.25c
Tulsa	3.25c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.36c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York‡(d)	3.37c
Philadelphia*	2.98c
Pittsburgh (h)	3.15c
Portland (i)	3.50c
San Francisco	3.25c
Seattle (i)	3.70c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c

PLATES

Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York‡(d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.35c
San Francisco	3.25c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.75c
Milwaukee	3.16c
New Orleans	3.55c
New York‡(d)	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh(h)	2.95c
San Fracisco	3.35c
Seattle	3.70c
St. Louis	3.45c
St. Paul	3.30c
Tulsa	3.70c

NO. 24 BLACK

Baltimore*†	3.60c
Boston (g)	3.95c
Buffalo	3.25c
Chattanooga	4.16c
Chicago	3.85c
Cincinnati	4.02c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New Orleans	4.50c
New York‡(d)	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.00c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.90c
Tulsa	4.75c

NO. 24 GALV. SHEETS

Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.95c
New York‡(d)	4.30c
Philadelphia*†	4.40c
Pitts.**(h)	4.15-4.45c
Portland	5.00c
San Francisco	4.50c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.50c
Tulsa	5.10c

BANDS

Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅛-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York‡(d)	3.56c
Philadelphia	3.18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.10c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.45c

HOOPS

Baltimore	2.30c
Boston††	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York‡(d)	3.56c
Philadelphia	3.43c
Pittsburgh (h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.55c

COLD FIN. STEEL

Baltimore (c)	3.73c
Boston	3.90c
Buffalo (h)	3.55c
Chattanooga*	4.13c
Chicago (h)	3.50c
Cincinnati	3.72c
Cleveland (h)	3.50c
Detroit	3.79c
Los Ang. (f) (d)	5.85c
Milwaukee	3.61c
New Orleans	4.30c
New York‡(d)	3.81c
Philadelphia	3.76c
Pittsburgh	3.50c
Portland (f) (d)	6.15c
San Fran.(f) (d)	5.95c
Seattle (f) (d)	6.15c
St. Louis	3.75c
St. Paul	4.02c
Tulsa	4.65c

COLD ROLLED STRIP

Boston, 0.100-in., 500 lb. lots	3.245c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.22c
Cleveland (b)	2.85c
Detroit	3.18c
New York‡(d)	3.36c
St. Louis	3.45c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70-10
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) shapes other than rounds, flats, fillet angles, 3.15c.

‡Domestic steel; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; † New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Feb. 27

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

PIG IRON	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Silicon	$15.54 3 2 6	$13.66	1 13 0
Basic bessemer	15.54 3 2 6	12.13	1 10 0
Hematite, Phos. .03-.05	17.71 3 11 0	.....	.....
SEMIFINISHED STEEL			
Billets	$29.19 5 17 6	$18.99	2 7 0
Wire rods, No. 5 gage	42.33 8 10 0	36.39	4 10 0
FINISHED STEEL			
Standard rails	$41.09 8 5 0	$44.47	5 10 0
Merchant bars	1.66c 7 10 0	1.13c to 1.18c	3 2 6 to 3 5 0
Structural shapes	1.66c 7 10 0	1.12c	3 1 6
Plates, †¼ in. or 5 mm.	1.80c 8 1 3	1.55c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2.16c 9 15 0	2.12c	5 16 0††
Sheets, gal., 24 gage, corr.	2.61c 11 15 0	2.29c	6 5 0
Bands and strips	1.88c 8 10 0	1.42c	4 0 0
Plain wire, base	2.05c 9 5 0	1.92c	5 5 0
Galvanized wire, base	2.39c 10 15 0	2.15c	5 17 6
Wire nails, base	2.66c 12 0 0	1.74c	4 15 0
Tin plate, box 108 lbs.	$ 4.67 0 18 9	.....	.....

British ferromanganese $75 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$17.43 3 10 0(a)	$17.36	260	$13.11	385	$25.62	63
Basic bessemer pig iron	17.43 3 10 0(a)	12.69	190	11.92	380	28.27 (b)	69.50
Furnace coke	4.86 0 19 6	6.35	95	4.17	122	7.73	19
Billets	27.39 5 10 0	28.72	430	18.90	555	39.25	96.50
Standard rails	1.83c 8 5 0	2.02c	671	1.69c	1,100	2.43c	132
Merchant bars	1.86c 8 12 0	1.69c	560	1.00c	650	2.02c	110
Structural shapes	1.95c 8 15 0	1.66c	550	1.00c	650	1.97c	107
Plates, †¼-in. or 5 mm.	2.01c 9 1 3	2.12c	700	1.23c	800	2.34c	127
Sheets, black	2.45c 11 10 0§	1.81c	600‡	1.36c	875‡	2.65c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.95c 13 10 0	2.87c	950	2.31c	1,500	6.82c	370
Plain wire	2.05c 9 5 0	2.72c	900	1.77c	1,150	3.18c	173
Bands and strips	2.07c 9 7 0	1.97c	650	1.23c	800	2.34c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 66.00 per cent over paper sterling.

Bars

Bar Prices, Page 88

Pittsburgh—A number of inquiries from automobile makers and parts suppliers feature the bar market. The bolt and nut trade last week specified steadily and numerous bar orders have originated with car shops and miscellaneous manufacturing interests. According to all expectations 1.85c, base, Pittsburgh, for bars will be reaffirmed.

Cleveland—Demand from automobile forgers shows further moderate improvement. Producers now look forward confidently to much larger consumption in the automobile industry this month. Other consuming industries have held their gains, except for some decline in machine tool manufacturers' requirements. Road machinery builders have increased their specifications. Protections at 1.90c, base, Cleveland, have been given on some large identified projects for second quarter, including railroad tonnage.

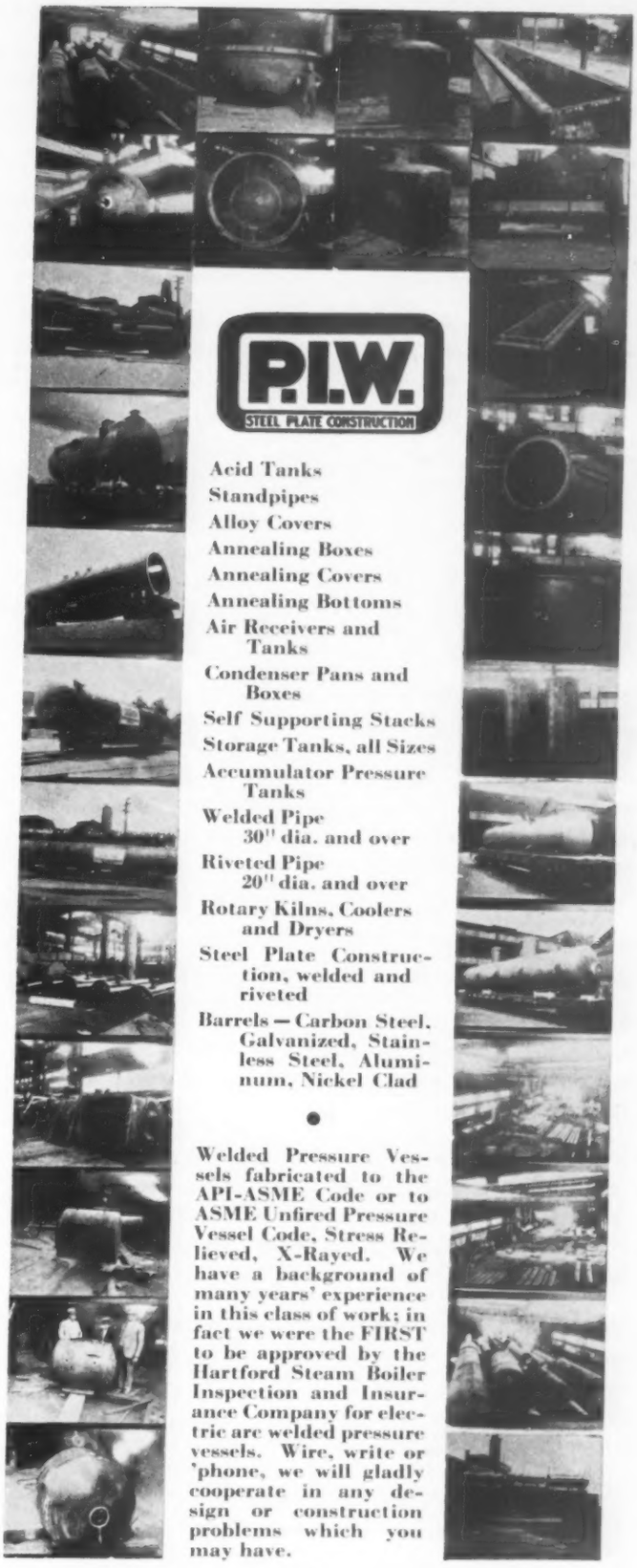
Chicago—Bar sales and specifications are moderately heavier despite continued quiet in automotive buying. Farm implement manufacturers are taking larger lots and operations of this industry are the best in most instances since 1929. Miscellaneous bar users also are specifying freely and with an increase in automotive demand looked for within the next few weeks, bar mills look for brisk operations for at least 60 days. Prices are relatively steadier than those of most other products and current quotations are expected to be extended into second quarter.

Boston—Steel bar demand is fairly good although not as heavy as in January. The market continues firm at 1.85c, base, Pittsburgh, or 2.27c, delivered, Boston. Foreign bars continue to sell as much as $5 to $8 a ton under domestic bars where large tonnages are involved.

New York—While no change is expected in second quarter prices, sellers of commercial steel bars anticipate improved specifications this month as a result of more favorable conditions.

Philadelphia—Commercial steel bar prices are steady at 1.85c, Pittsburgh, or 2.16c, Philadelphia, and it is generally believed there will be no change in price for second quarter. Specifications have been moderately good.

Detroit—Computed on a 1.85c, base, Pittsburgh, market for carbon steel bars, the Detroit delivered price is now firmly quoted at 2.00c. Recent report of weakness on bars appears to have been an isolated case which has since been corrected.



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STEEL PLATE CONSTRUCTION

Acid Tanks
Standpipes
Alloy Covers
Annealing Boxes
Annealing Covers
Annealing Bottoms
Air Receivers and Tanks
Condenser Pans and Boxes
Self Supporting Stacks
Storage Tanks, all Sizes
Accumulator Pressure Tanks
Welded Pipe 30" dia. and over
Riveted Pipe 20" dia. and over
Rotary Kilns, Coolers and Dryers
Steel Plate Construction, welded and riveted
Barrels — Carbon Steel, Galvanized, Stainless Steel, Aluminum, Nickel Clad

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Welded Pressure Vessels fabricated to the API-ASME Code or to ASME Unfired Pressure Vessel Code, Stress Relieved, X-Rayed. We have a background of many years' experience in this class of work; in fact we were the FIRST to be approved by the Hartford Steam Boiler Inspection and Insurance Company for electric arc welded pressure vessels. Wire, write or 'phone, we will gladly cooperate in any design or construction problems which you may have.

•

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Plates

Plate Prices, Page 88

Pittsburgh—Kingston Lake Gravel Co., Mapleton, Ill., has placed an order for two or four 130-foot steel barges with St. Louis Shipbuilding Co., St. Louis, each of which requires about 135 tons of plates. Jones & Laughlin Steel Corp., Pittsburgh, has received a 175-ton contract for a fuel oil barge from W. H. Gahagen Inc., Brooklyn, N. Y. Car shops are also providing considerable inquiry and the plate market is at an active peak for 1936. The market of 1.80c, base, Pittsburgh, doubtless will be extended for second quarter.

Cleveland—Platemakers are bidding on several thousand tons for railroad cars, which are expected to be awarded shortly. Demand from tank fabricators and boiler manufacturers is light.

Chicago—Improvement in car material orders is providing additional plate business, while structural fabricators also are ordering steadily. Industrial tank work is quiet and placing of municipal water tanks also is slow.

Boston—Good business features the steel plate market here. Sales show some increase and prospects seem to justify expectation of a further gain. Current business is largely small tonnages for specific work. The plate market continues firm at 1.90c, base, Coatesville, or 2.22c, delivered, Boston.

Philadelphia—Plate sellers are expected to reaffirm the present 1.90c, Coatesville, Pa., price for second quarter, although they may not take formal action in opening their books for another couple of weeks or so. Action is expected this week in the award of either one or two passenger cargo boats for the American-South African Steamship Line Inc., New York, each requiring about 5000 tons of hull steel.

New York—Plate demand is sluggish. Pending railroad work is promising and includes 1000 cars which Norfolk & Western will build in its own shops. Bethlehem Steel Corp. is reported to have booked about 8100 tons of large steel water pipe for St. Louis.

Contracts Placed

8100 tons, large water pipe for St. Louis; reported let to Bethlehem Steel Corp., Bethlehem, Pa.

725 tons, tank and tower, Ft. Knox, Ky., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

510 tons, 1,000,000-gallon elevated tank, Muskegon, Mich., to Chicago Bridge & Iron Works, Chicago.

500 tons, three trawlers for Bay State Fish Co., Boston; to Bath Iron Works, Bath, Me.; 400 tons of plates and 100 tons of shapes to be furnished by eastern mills.

270 to 540 tons, two or four 130 x 32 x 7-foot barges, for Kingston Lake Gravel Co., Mapleton, Ill., to St. Louis Shipbuilding Co., St. Louis.

175 tons, one fuel oil barge, 130 x 32 x 9 feet, for W. H. Gahagan Inc., Brooklyn, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh; delivery about April 1 for service between Chicago and Green Bay, Wis.

150 tons, 150,000-gallon tank and 141-foot tower, South Gate, Calif., to Chicago Bridge & Iron Works, Chicago.

125 tons, 14 and 16-inch welded steel pipe, treasury department, Fresno, Calif.; invitation No. 4-171 and No. 4-172, to unnamed interests.

Unstated tonnage, derrick boat for United States engineers, Chicago, to Bethlehem Steel Corp., Bethlehem, Pa.

Contracts Pending

1362 tons, 36-inch welded steel pipe, treasury department, Berkeley, Calif.; bids opened.

400 tons, storage tanks, Metropolitan Coal Co., Boston.

275 tons, two tanks, Sacramento, Calif.; Campbell Construction Co., Sacramento, low on general contract.

175 tons, hull plate, schedule 7217, Mare Island navy yard, Calif.; bids opened.

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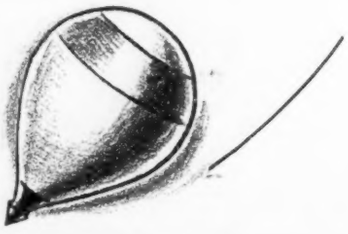

Titan Metal Manufacturing Company
Brass and Bronze Products
Bellefonte, Pennsylvania

Sheets

Sheet Prices, Page 88

Pittsburgh—Early this week producers will determine second quarter sheet prices, including the possible reclassification of the market on a quantity differential basis and possibly readjustment of certain extras. This might correct the present uncertain price situation, with its $3 to $5 a ton concessions. Specifications include an attractive lot of miscellaneous buying that is averaging carload size. There is full finished automotive tonnage buying.

Cleveland — Fill-in orders for sheets continue to be placed by automobile manufacturers, and some producers note a slight gain in volume. More substantial buying is expected this month as the industry prepares for spring production schedules. The Fisher Body plant here has advanced from a four to a five-day week basis. Demand from refrigerator and stove manufacturers is strong. Prices for second quarter probably will be announced this week. The market has been unsettled, with $3 a ton concessions general. Last week there was some discussion of a $1 a ton advance in base prices, with a quantity differential system, enabling all buyers to share in discounts for the larger tonnages.

Chicago—Recent weakness in sheet quotations, amounting up to $3 a ton, is expected to be corrected during the coming quarter. Announcement of a new pricing plan, under consideration recently and including quantity differentials, is looked for with the opening of second quarter books this week. A small gain has appeared lately in automotive sheet demand, with more definite recovery anticipated for late March. Business elsewhere has been fairly steady though restricted somewhat by price uncertainty.

Boston — The recession in sheet prices, after being reported generally in other sections of the country, now also applied to the New England market. All sheet prices, with the exception of tin mill products and electrical sheets, are down $3 a ton. The reductions do not appear to have brought out any new business of importance but specifications against first quarter contracts have improved. Truscon Steel Co., Youngstown, O., has booked 225 tons of pressed steel sheet tunnel lining for the Oak Hill sewer project at Newton, Mass.

New York—Pending formal opening of books for second quarter, the sheet market here is unsettled. In some quarters the restoration of recent official prices is expected. Requirements have been mounting for the past several weeks. An interesting recent transaction involved the placing of 2400 tons of pressed sheet steel tunnel lining for a sewer in the Bronx. This was awarded to the Truscon Steel Co., Youngstown, O., 2000 tons being placed by the Rosoff Engineering Corp. and 400 tons by Rodgers & Haggerty.

Philadelphia—While sheet prices remain unsettled, early announcement of prices for second quarter, combined with improved specifications which are expected as soon as the weather opens up, may have a stimulating influence. Meanwhile, sellers are confining their concessions to shipments by the end of March.

Washington — Bids were opened Feb. 26 on 6000 tons of steel stacks and shelving to be installed in the Archives building here. This, it is reported, will be the largest order of its kind ever placed. The bids were as follows: Snead & Co., Jersey City, N. J., $1,385,900; Breeze Corp., Newark, N. J., $1,499,005; Berger Mfg. Co., Canton, O., $1,584,022; General Fireproofing Co., Youngstown, O., $1,655,964; Globe-Wernicke Co., Cincinnati, $1,826,672;

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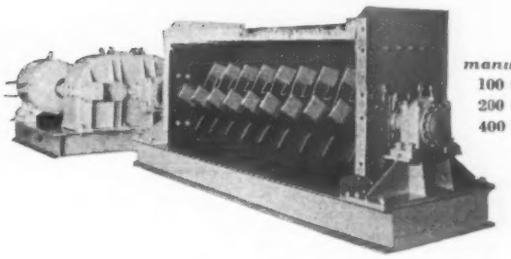
PUG MILL



manufactured in three sizes
100 to 150 Tons per hour
200 to 300 Tons per hour
400 to 500 Tons per hour

Here is a Sintering Plant Pug Mill that is built for its job.

In its general design as well as in the selection of material for its component parts the greatest care was exercised with a view toward constructing a mill of large capacity with the lowest possible operating and upkeep cost per ton of output.

The abrasive qualities of iron ore concentrates, flue dust, and sinter fines is well known and the proper mixing of the materials requires expert and intimate engineering knowledge of the problems involved. For this reason Bailey was first asked by one of the large Steel Corporations to build the original mill for their use.

These mills have proved themselves sufficiently rugged and of the proper design to operate continuously for months without repair expense and at the same time do an exceptionally efficient job of mixing.

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WILLIAM M. BAILEY COMPANY
Engineers
MAGEE BLDG. PITTSBURGH, PA.
European Agents—Ashmore, Benson, Pease & Co. Ltd., Stockton-on-Tees, England

McClosky Co., New York, $1,933,000; Art Metal Construction Co., Jamestown, N. Y., $2,105,000.

Buffalo—Production has been curtailed further as automotive demand has continued to decline. Bethlehem Steel Corp's. Seneca mill is at 60 per cent.

Cincinnati—The market is quiet with prices unsteady. Specifications were maintained fairly well and some of the spring bulge in automotive needs is beginning to appear.

St. Louis—Some uncertainty relative to sheet prices is noted in this area. Sellers will open books early in March, but changes, if any, are not expected to be marked. Shipments since the weather moderated have shown decided improvement.

Birmingham, Ala.—Mills are producing steadily and shipments are equal to output. New business is satisfactory and indications point to continued demand.

Cold Finished

Cold Finished Prices, Page 89

Pittsburgh—It is expected that books will be opened on cold-finished bar products for second quarter at no change from the present 2.10c. base, Pittsburgh, market and that other basing points will be likewise quoted unchanged. The market is quiet but indicates an upward trend within ten days to two weeks.

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DRIVER-HARRIS COMPANY
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Pipe

Pipe Prices, Page 89

Pittsburgh—Officials of the Columbia Gas & Electric Co. are favoring the use of seamless pipe to construct the 20 or 22-inch pipe line which will supply natural gas to Detroit from existing line facilities in Illinois. The total tonnage may be close to 50,000 tons. The market on tubular products is steady, with specifications sufficient to engage mills at about 45-50 per cent. All discounts are quotably unchanged.

Chicago—Cast pipe continues relatively quiet as regards orders and inquiries. While this normally is the period of expanding activity, practically the only business appearing in larger tonnages is for WPA projects. Chicago is in the market for 115 tons of offset bends, while 375 tons is pending for the Chicago sanitary district.

Boston—While recent lettings in cast pipe have been comparatively light, more new tonnage is coming out. About 2500 tons is pending, and numerous additional projects are slated to develop soon.

New York—New cast pipe orders aggregate about 1500 tons, of which 900 tons were comprised of three large lots. Pending jobs on which early action is expected, involve at least 6000 to 7000 tons. Much additional work involving cast pipe is in sight. Prices are unchanged and firm.

Philadelphia—Pipe and tubular goods are moving fairly well, and public utility work continues promising. Notwithstanding the TVA decision, extensive plans for improvements by utility companies are going ahead in an effort to effect more economical operation.

St. Louis—Bethlehem Steel Corp., Bethlehem, Pa., was low for furnishing, coating and delivering 17,357 feet of 60-inch welded steel pipe, 9/16-inch thick, and 29,400 feet of 60-inch pipe, ½-inch thick, a total of 9000 tons, for a conduit from Howard Park pumping station to Stacy Park reservoir, St. Louis. Bid also includes couplings.

Birmingham, Ala.—Pipe shops are melting iron steadily and are shipping pipe in various directions. Local consumption is again showing an increase. United States Pipe & Foundry Co., Burlington, N. J., has

booked an order for 2250 tons of 16 to 30-inch pipe for the Birmingham industrial water project.

San Francisco—The only cast pipe award of size involved 123 tons of 6 to 18-inch pipe for Yakima, Wash., to United States Pipe & Foundry Co. The treasury department at Los Angeles and San Francisco has opened bids on 131 tons of 6-inch, and 100 tons of 4-inch pipe. Bids have been opened on 270 tons of steel tubing, ranging from ½-inch to 2-inch by the bureau of reclamation, Denver, under invitation 38220-A. King county water district No. 42, Wash., will open bids March 10 for 249,595 feet of 1½ to 12-inch steel pipe.

Cast Pipe Placed

400 tons, to Donaldson Iron Co., Emaus, Pa., through procurement division, treasury department, New York.
400 tons, department of water supply, New York, to Warren Foundry & Pipe Corp., Phillipsburg, N. J., through procurement division, treasury department, New York.
330 tons, WPA work, Boston to Warren Foundry & Pipe Corp., Phillipsburg, N. J.
123 tons, 6 to 18-inch, Yakima, Wash., to United States Pipe & Foundry Co., Burlington, N. J.
100 tons, Mt. Vernon, N. Y., to Donaldson Iron Co., Emaus, Pa.

Cast Pipe Pending

1600 tons, water system, Harwich, Mass.; Whitman & Howard, Boston, engineers.
500 tons, department of purchase, New York; United States Pipe & Foundry Co., Burlington, N. J., low.
390 tons, Falmouth, Me.; Central Foundry Co., New York, low. John MacDonald Construction Co., Boston, general contractor.
375 tons, Chicago sanitary district; bids in.
300 tons, 10-inch, Barnstable, Mass.; Warren Foundry & Pipe Corp., Phillipsburg, N. J., low. L. Capaldi, Providence, R. I., low on general contract.
200 tons, procurement division, treasury department, New York, for work at Buffalo; United States Pipe & Foundry Co., Burlington, N. J., low.
170 tons, 8 and 12-inch, Fall River, Mass.; United States Pipe & Foundry Co., Burlington, N. J., low.
131 tons, 6-inch, class 250, treasury department, Los Angeles, schedule 6042; bids opened.
115 tons, offset bends, Chicago; bids March 9.
100 tons, 4-inch, treasury department, San Francisco, invitation 919; bids opened.

Semifinished

Semifinished Prices, Page 89

Pittsburgh—Orders for semifinished steel last week improved to the best total for any week in February. This should result in heavier rolling schedules in early March. Buying was well spread among sheet bars and rerolling billets, with some representative orders for skelp, tube rounds and wire rods. Shipments of semifinished steel are proceeding at $27, Pittsburgh, on rerolling billets, $28 on sheet bars, and $40 for common wire rods. On billets and sheet bars the $2 a ton advance has not yet been tested.

Boston—Wire rod shipments particularly are heavy. The market on rods continues firm at $42 base Worcester, Mass. Included in new business is a sale of a substantial tonnage of rerolling billets at $29, base, Buffalo. Forging billets are quoted nominally at $35, base, Buffalo.

Tin Plate

Tin Plate Prices, Page 88

Pittsburgh—Tin plate production has advanced about 10 points to 75 per cent. Mill inventories March 1 showed a slight advance compared with Jan. 1, indicating a large share of present tonnage is being rolled in anticipation of spring business. Twenty to 25 per cent of current business is for export. The $5.25 per base box price is in effect for the 1936 contract season.

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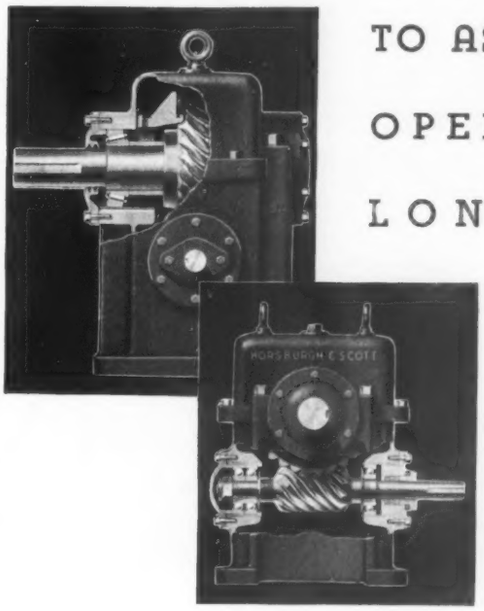

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Transportation

Track Material Prices, Page 89

Activity of buying by railroads continues, new business coming out steadily. Norfolk & Western will build 1000 coal cars in its own shops, as well as five mallet-type locomotives and will buy 20,000 tons of rails. Chicago, Milwaukee, St. Paul & Pacific will build 37 passenger cars in its own shops. The New York, New Haven & Hartford this year will substitute cast steel side frames for arch bar sides on about 2500 freight cars. Ten locomotives and 50 passenger coaches are still pending for the New Haven.

Western Pacific, which recently placed 21,000 tons of rails with Colorado Fuel & Iron Co. and Columbia Steel Co., has distributed 10,000 tons of track fastenings to undesignated suppliers.

Missouri Pacific has divided 17,000 tons of 90-pound rail between a number of makers, including 4500 tons for its subsidiary, International-Great Northern. This road has placed 300 forty-ton steel box cars with American Car & Foundry Co., New York.

Chicago, Milwaukee, St. Paul & Pacific has obtained approval of a loan for the purchase of 28,000 tons of steel rails now on inquiry and has asked authority to issue trust certificates to finance purchase of new equipment for which it inquired recently.

Chicago Surface Lines, Chicago, has been authorized by the federal court to buy 83 new street cars at cost of about $1,292,119.

Car Orders Placed

Missouri Pacific, 300 forty-ton steel box cars to American Car & Foundry Co., New York.

Norfolk & Western, 1000 steel coal cars, to own shops.

Locomotives Placed

Norfolk & Western, five mallet type locomotives, to own shops.

Rail Orders Placed

Missouri Pacific, 17,000 tons 90-pound rails, to Bethlehem Steel Corp., Inland Steel Co., Carnegie-Illinois Steel Corp., Tennessee Coal, Iron & Railroad Co., and Colorado Fuel & Iron Co.; includes 4500 tons for International-Great Northern.

Car Orders Pending

Chicago Surface Lines, 83 street cars; court authorization given for purchase.

Rail Orders Pending

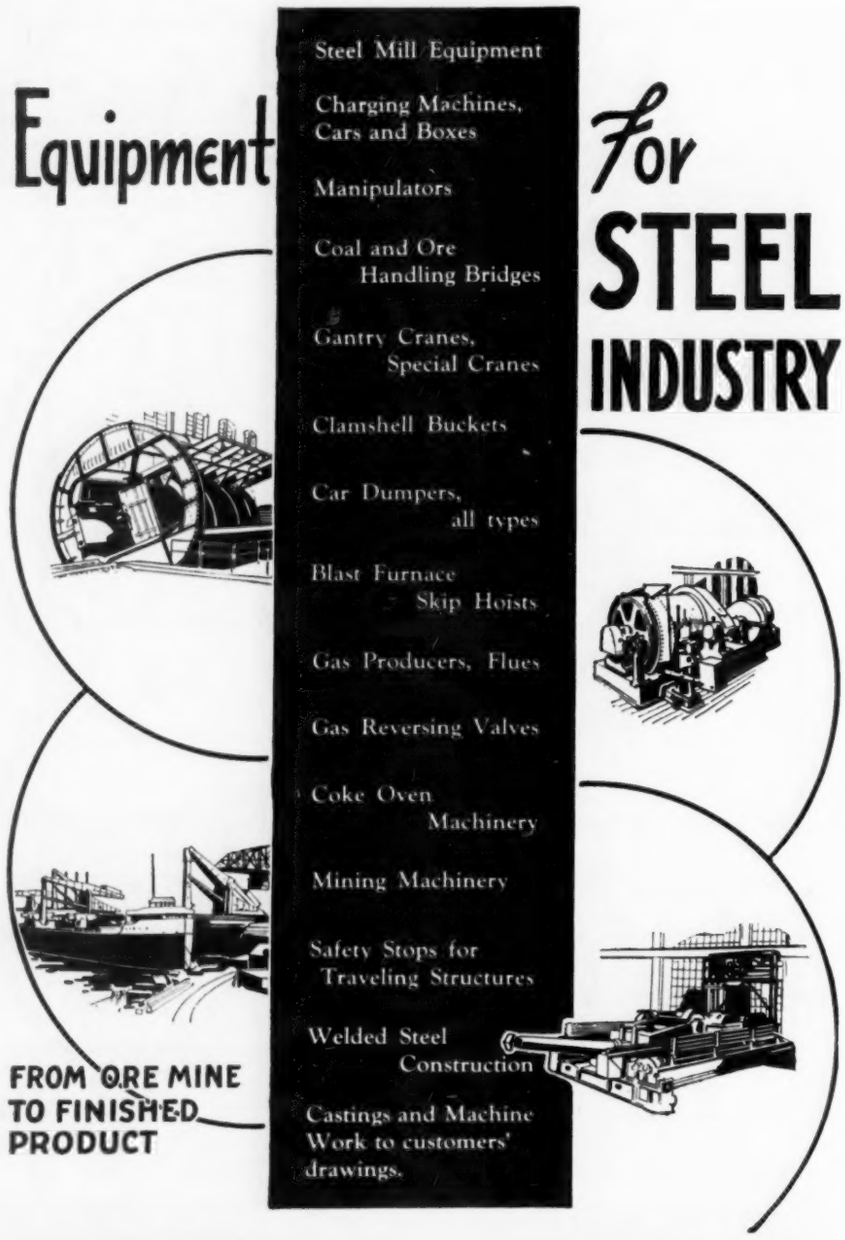
Norfolk & Western, 20,000 tons.

Buses Booked

American Car & Foundry Motors Co., New York: Five 30-passenger for Chicago & Calumet Transportation Co., Hammond, Ind.; four 29-passenger for Staten Island Coach Co., Staten Island, N. Y.; three 40-passenger for Boston Elevated Railway, Boston; two 30-passenger for Transit Co. of Harrisburg, Pa.

Twin Coach Corp., Kent, O.: Ten 22-passenger for Eastern Massachusetts Street Railway Co., Boston; nine 23-passenger for Savannah Electric & Power Co., Savannah, Ga.; eight 23-passenger for Tri-City Railway Co. of Iowa, Davenport, Iowa; seven 40-passenger for Akron Transportation Co., Akron, O.; six 25-passenger for Grand Rapids Railroad Co., Grand Rapids, Mich.; six 23-passenger for Pacific Electric Railway Co., Los Angeles; four 23-passenger for Mississippi Power & Light Co., Jackson, Miss.; four 31-passenger for Central Illinois Electric & Gas Co., Rockford, Ill.

Rush-Roberts Engineering Co. has been formed by D. B. Rush and Keith Roberts, with offices in the Field building, Chicago. The company will specialize in structural testing.



Wire

Wire Prices, Page 89

Pittsburgh — Announcement of prices on merchant and manufacturing wire for second quarter is being awaited. Corrective means doubtless will be taken in merchant wire products, but prices are firm on manufacturing wire items at the present quotation of 2.30c, base, Pittsburgh or Cleveland, for bright wire and 2.90c on spring wire.

Cleveland — Price concessions on nails and other wire products which became general last week failed to increase buying, although reported as restricted to shipments before April 1. Makers had not decided on their price policy for second quarter. Manufacturers' wire has held fairly steady.

Chicago—Some wire producers state they do not expect to open second quarter books for another week, pending determination of a selling plan to be put into effect for the coming period. It is possible that the new plan will correct price weakness which has prevailed in wire products lately. Plain wire and wire rods have been relatively steadier than merchant products. The latter have been unsettled to a certain extent by increased competition from foreign material which has moved as far inland as this district.

Boston—One of the bright spots in the finished steel market is manufacturing wire, in which gratifying volume is reflected. Such wire continues firm at 2.40c, base, Worcester, Mass. Spring wire also is firm at 3.00c, base, Worcester. Wire products, however, are not so firm, particularly wire nails which, though quoted at $2.40, Pittsburgh, per 100-pound keg, actually are going at $2.10 and $2 to jobbers.

Strip Steel

Strip Prices, Page 89

Cleveland—Demand from automobile manufacturers has been disappointing to mill interests here, and in view of light buying so far for March they are inclined to be skeptical of some of the optimistic reports concerning automobile output this month. Price concessions of $3 a ton have been freely offered, and late last week quotations for second quarter had not been announced.

Pittsburgh—Most important buyers of strip steel last week purposely withheld specifications until a firmer price policy was in evidence from producers. Report of $3 a ton weakness in both hot-rolled and cold-rolled strip steel has become widely known with the result that the market has been quoted 1.70c to 1.85c, base, Pittsburgh, on hot-rolled and 2.45c to 2.60c on cold rolled. If extensive changes in extras, quantity differentials and other corrective measures are taken, the strip market will be on a firmer basis for second quarter.

Chicago—Some delay is expected in opening second quarter books for strip as some producers are not ready to announce. A move has been under consideration recently to correct the weakness in strip prices. Demand is fairly steady and although occasional gains are noted in automotive orders, activity from this source still lags. A recovery in the latter is in prospect, however, for late March.

New York—Strip prices continue weak, although efforts to restore recent prices for second quarter may prove successful. Prospects are for improved business once the market becomes stabilized.

Boston—Cold-rolled strip steel, following developments in other sec-

SPECIAL SEAMLESS SHELLS AND SHAPES

AND

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NEW YORK — CHICAGO — PHILADELPHIA — DETROIT — CLEVELAND

tions of the country, has declined $3 a ton to 2.65c, base, Worcester, Mass. Hot-rolled strip is quoted nominally at 1.70c, base, Pittsburgh, but no new business is reported as having been placed recently. Specifications against first quarter strip contracts are somewhat better in New England.

Philadelphia—Strong rumors persist that when books are opened for second quarter on strip and sheets quantity differentials will be announced whereby large tonnage buyers will receive preferentials.

Shapes

Structural Shape Prices, Page 88

New York—Although new lettings of structural steel in this territory are small, a large tonnage is to be closed in the next few weeks. Several contracts are held up for the approval of WPA authorities. The market on plain structural shapes continues firm at 1.90c base Bethlehem, equivalent to 2.06½c delivered New York. As usual, some foreign steel is selling at less.

Pittsburgh—American Bridge Co., Pittsburgh, has entered contracts for 3110 tons in a tier building and warehouse at New York for the Royton Realty Corp., and 1470 tons for an express highway from West Seventy-ninth to West Eighty-second street, New York. Among attractive inquiries at present are 2100 tons in a bridge over the Kanawha river at Charleston, W. Va., for March 12, and 1200 tons for an engineering building at Lansing, Mich., for the Olds Motor Co., March 2.

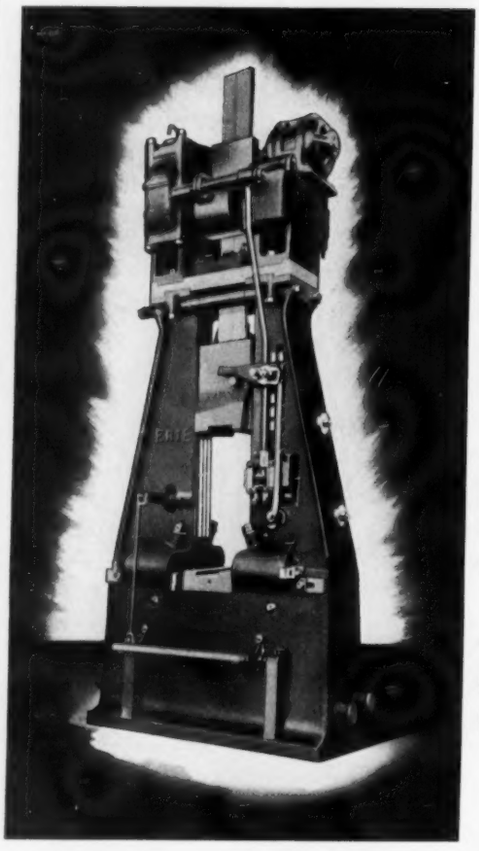
Cleveland—Awards and new inquiries are light. Ohio Bell Telephone Co., Cleveland, is expected to placed 400 tons for a building this week, while bids are being taken on a bridge and building for the Great Lakes exposition, Cleveland, amounting to 425 tons. Fabricators are figuring a considerable number of small school and industrial jobs.

Chicago — Orders, while fairly heavy, are smaller than those a week ago. Tennessee Valley Authority placed 7400 tons of piling with Inland Steel Co. and Bethlehem Steel Corp. Other large orders include 1000 tons for a Louisville, Ky., warehouse and 1300 tons for bearing piles at San Diego, Calif. Bridges predominate new inquiries, including 1775 tons at Kansas City, Mo., 950 tons in Wisconsin, and 700 tons in Indiana.

Boston—New structural awards in this territory aggregate 1500 tons. Including the Connecticut river bridge, 7000 tons, at Middletown, Conn., on which bids open March 9, projects now up for quick action aggregate over 10,000 tons. Plain shapes continue firm at 1.90c, base, Bethlehem, or 2.20½c, delivered, Boston, so far as domestic steel is concerned. Foreign shapes, as usual, can be had at less.

Philadelphia—Numerous jobs are accumulating, headed by the 3500-ton plant addition for the Viscose Corp. at Meadville, Pa., which has been pending for some time. With moderation in the weather, consid-

THE IDEA CLICKS.



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ERIE

Shape Awards Compared

	Tons
Week ended Feb. 29	33,125
Week ended Feb. 22	30,697
Week ended Feb. 15	9,350
This week 1935	11,321
Weekly average, 1935	17,081
Weekly average, 1936	23,785
Weekly average, February	23,355
Total to date, 1935	119,418
Total to date, 1936	214,062

erable improvement in actual awards should develop. At present structural contracts are light. Shapes are steady at 1.90c, Bethlehem, Pa., or 2.01½c, Philadelphia, figures which will probably be reaffirmed for second quarter.

Buffalo—Inquiry is broadening gradually but weather conditions continue to retard construction of all types. An inquiry of 1000 tons for the Corning Glass Works, Corning, N. Y., another of 600 tons for a crossing project in Jamestown, N. Y., and numerous smaller lots are pending.

St. Louis—Fabricators have booked a good volume of orders, as a result of which the average rate of operations for the leading plants has been stepped up from 35 per cent to 50 per cent. One important interest is working at 75 per cent. Public works jobs predominate.

San Francisco—Structural shape lettings were the largest for any week so far this year and totaled 4270 tons, bringing the aggregate to 20,241 tons, compared with 10,813 tons for the same period last year. New inquiries include 458 tons for a bridge near Greeley, Colo., up for bids March 3.

Shape Contracts Placed

16,000 tons, open-hearth and slab yard buildings and gas producers, Great Lakes Steel Corp., Detroit, division of National Steel Corp. Pittsburgh, to Whitehead & Kales Co., Detroit.

3110 tons, tier building and warehouse, for Rayton Realty Corp., Hudson and Varick streets, New York, to American Bridge Co., Pittsburgh, through Post & McCord, New York. Noted in STEEL, Feb. 24, for unstated buyer.

7400 tons, piling, TVA; 420 tons to Inland Steel Co., Chicago, and 3200 tons, Bethlehem Steel Corp., Bethlehem, Pa.

1800 tons, public school No. 239, Brooklyn, N. Y., to Bethlehem Steel Corp., Bethlehem, Pa.

1540 tons, New York Central railroad work in connection with express highway, Seventy-ninth to Eighty-second streets, New York, to American Bridge Co., Pittsburgh, through James Stewart & Co., New York.

1000 tons, distilling warehouse, Louisville, Ky., to Joseph T. Ryerson & Son Inc., Chicago.

825 tons, grade separation, Detroit; 500 tons to Jones & Laughlin Steel Corp., Pittsburgh, and 325 tons to R. C. Mahon Co., Detroit.

710 tons, ventilator building, Midtown-Hudson tunnel, New York, to Bethlehem Steel Corp., Bethlehem, Pa.

610 tons, state highway bridge, South Milwaukee, Wis., to Worden-Allen Co., Milwaukee.

600 tons, coal tipple, Holden, W. Va., to Vierling Steel Works, Chicago.

520 tons, building for Hygrade Sylvania Co., Salem, Mass., to New England Structural Co., Everett, Mass.

500 tons, building, for Washburn Wire Co., New York, to Bethlehem Steel Corp., Bethlehem, Pa.

470 tons, Eastern high school, Baltimore, to American Bridge Co., Pittsburgh.

450 tons, bridge at Blackfoot, Bingham county, Idaho, to Virginia Bridge & Iron Co., Roanoke, Va.

448 tons, seven bridges in Fremont county, Wyoming, to Midwest Steel & Iron Works, Denver, Co.

330 tons, 88 galvanized towers, St. Paul, to American Bridge Co., Pittsburgh.

325 tons, post office, Santa Barbara, Calif., to Bethlehem Steel Corp., Bethlehem, Pa.

320 tons, Great Lakes Steel Corp., foot bridge, Ecorse, Mich., to Whitehead & Kales Co., Detroit.

310 tons, highway bridge, Grandville, Mich., to Bethlehem Steel Corp., Bethlehem, Pa.

300 tons, Metropolitan Coal Co. wharf, Boston, to Jones & Laughlin Steel Corp., Pittsburgh.

300 tons, hospital addition, Waltham, Mass., to Lehigh Structural Steel Co., Allentown, Pa.

285 tons, Fischer Scientific Co. building, Pittsburgh, to Pittsburgh Bridge & Iron Works, Rochester, Pa.

285 tons, state highway bridge, Chemung county, New York, to Fort Pitt Bridge Works, Pittsburgh.

260 tons, furnace building, Texas City,

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Tex., for Standard Oil Co., to Ingalls Iron Works Co., Birmingham, Ala.

260 tons, hospital, Louisville, Ky., to Bedford Foundry & Machine Co., Bedford, Ind.

260 tons, New York Central railroad bridge, Carmen, N. Y., to Phoenix Bridge Co., Phoenixville, Pa., through Foley Bros., New York.

255 tons, Homestead bridge ramp, Homestead, Pa., to American Bridge Co., Pittsburgh.

250 tons, storeroom for United States treasury, Brooklyn bridge, to Ingalls Iron Works Co., Birmingham, Ala.

250 tons, Veterans Memorial building, Long Beach, Calif., to Pacific Iron & Steel Co., Los Angeles.

250 tons, Young Analine Works addition, Baltimore, to Dietrich Brothers, Baltimore.

250 tons, city hall, Medford, Mass., to Lehigh Structural Steel Co., Allentown, Pa.

230 tons, addition to school No. 127, Elmhurst, Long Island, New York, to Ingalls Iron Works Co., Birmingham, Ala.

230 tons, children's school building, Rome, N. Y., to Belmont Iron Works, Philadelphia.

215 tons, bleachers, Waterloo, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

205 tons, state highway bridge, Erie county, New York, to Fort Pitt Bridge Works, Pittsburgh.

205 tons, state highway bridge, Monroe county, New York, to Genesee Bridge Co., Rochester, N. Y.

200 tons, state highway bridge Southport, N. Y., to Fort Pitt Bridge Works, Pittsburgh.

195 tons, Pennsylvania railroad grade crossing elimination, Franklinville, N. Y., to American Bridge Co., Pittsburgh.

190 tons, beam spans, St. Louis, for Missouri Pacific railroad, to Missouri Bridge & Iron Co., St. Louis.

185 tons, steel sheet piling, Anderson dam, near Harrisburg, Pa., through Ganett, Eastman & Fleming, Harrisburg, general contractors, to Jones & Laughlin Steel Corp., Pittsburgh.

180 tons, state highway bridge, Woodbury, N. Y., to Bethlehem Steel Corp., Bethlehem, Pa.

175 tons, state highway bridge, Highland, Mich., to R. C. Mahon Co., Detroit.

173 tons, plates, shapes, and steel forms, specification 144, metropolitan water district, Los Angeles, to Lakeside Bridge & Steel Co., Milwaukee.

150 tons, bridge, Quincy, Mass., to Bethlehem Steel Corp., Bethlehem, Pa., through Coleman Bros. Corp., Boston.

150 tons, store building for Sullivan estate, Elmira, N. Y., to Genesee Bridge Co., Rochester, N. Y.

150 tons, tunnel ribs, Bid 33793, metropolitan water district, Los Angeles, to Consolidated Steel Corp., Los Angeles.

150 tons, tunnel ribs, bid 51635, metropolitan water district, Los Angeles, to unnamed interest.

140 tons, ring beam flange plate, Fort Peck, Montana, to By-Products Steel Corp., Coatesville, Pa.

120 tons, municipal garage, Medford, Mass., to New England Structural Co., Everett, Mass.

115 tons, state highway bridge overpass, route 6 section 7, Bergen county, New Jersey, to American Bridge Co., Pittsburgh.

110 tons, state highway bridge, Newark, N. Y., to Lackawanna Steel Construction Corp., Buffalo.

110 tons, two bridges at Pleasant Grove, Utah, to unnamed interest.

109 tons, bridge in Big Horn county, Wyoming, to unnamed interest.

105 tons, beam spans, Harris county, Texas, to Alamo Iron Works, San Antonio, Tex.

100 tons, bridge, Springfield, Mass., to Bethlehem Steel Corp., Bethlehem, Pa.

100 tons, school, Woodmere, N. Y., to Dreier Iron Works, New York.

Shape Contracts Pending

9000 tons, state highway bridge over Connecticut river, Middletown, Conn.; bids March 9; reported in STEEL, Feb. 24, as inquiry for 7000 tons.

2100 tons, bridge over Kanawha river, Charleston, W. Va.; bids March 12.

1900 tons, Black river bridge, Elyria, O., readvertised for March 12.

1775 tons, viaduct between Kansas City, Kans., and Missouri.

1250 tons, Northeast high school, Philadelphia; new bids asked for March 6.

1200 tons, engineering building, for Olds Motor Works, Lansing, Mich.; bids March 2.

1000 tons, state highway bridges, Wisconsin, scattered locations; bids March 6.

920 tons, plant building, Corning, N. Y., for Corning Glass Co.; bids in.

900 tons, narcotic farm building, Fort Worth, Tex.

Behind the Scenes with STEEL

Hot Mail

LATEST plaything for gadget-lovers is a direct-mail piece on which the "message" is written in invisible, combustible ink. A lighted cigarette is touched to a certain spot and the thing starts sputtering. After some minutes the hidden words are burned right into the paper while the addressee stares in amazement.

We've seen several of these in the last few weeks, one from a New York hotel, two others from enameling concerns. Occasionally, after the smoldering has started, it will abruptly cease for some reason. Then you have to light up another cigarette and start it over again. Great thing for the cigarette people.

Years ago, when we had a Chemcraft No. 7 set, we used to fool around with these combustible inks, when we weren't changing wine to water and back to wine, or milk to water and back to milk. As we recall it, you took a spoonful of box No. 22, sodium nitrate, a spoonful of box No. 65, potassium chlorate, and dissolved them in a little water. This gave you an ink which would burn like wildfire. We tried it on a tablecloth once. It worked.

These direct mail pieces with their "burning messages" are patented by an organization which calls itself the Twenty First Century Novelty Co. in New York. That name got us for a moment. Just 100 years ahead of the pack. We toyed with the idea of starting up a competing company and calling it the Twenty Second Century Super Super Novelty Co.

* * *

Benefactor

BIBLIOTHEK DER EIDGEN TECHNISCHEN HOCHSCHULE in Zuerich, Switzerland, is going to have a valuable addition to its extensive library over the next five years, as a result of a recent $48.50 donation from a friend in Los Angeles.

You guessed it—a five-year subscription to STEEL.

* * *

Drama Dept.

FROM the January issue of the *Reading Puddle Ball*, in "The Story of Genuine Puddled Wrought Iron," we glimpse the following: "Even Mathuris Jousse, the famous French smith of the 17th Century, was unable to believe that the celebrated hinges on the western portals of Notre Dame Cathedral could possibly have been forged . . . . Yet forged they were; beaten out of the glowing metal by an artist who must forever rank as one of the world's finest. Because he chose wrought iron—metal of the ages—as his medium, his work will endure long after the choicest paintings in our museums have crumbled to dust."

For no reason at all, this passage brings to mind that famous 10-second drama of youth, entitled:

THE MISSING PAPERS

Tom Rover: And now, Dan Baxter, where are the papers, where are the papers?

Dan Baxter: Heh-heh, they're down at the blacksmith shop being forged. Heh-heh-heh!

* * *

In the Headlines

THIS department has broken into the headlines again, this time in a 120-point Gothic bold screamer. For verification, see the *Automatic Daily Noose* for Jan. 4, self-styled Crepe Hanger of the Industry. It was a burlesque sheet printed by *Automotive Daily News*, gently kidding (?) its Detroit editor, Chris Sinsabaugh on his 48th anniversary as a chronicler. Very amuzin'.

* * *

Millennium Here

BOB NEAL, inventor of Arkadelphia, Ark., has really got hold of something. This we learn from details published in the *Little Rock, Ark., Gazette*. In brief, it is a 16-cylinder compressed air motor, in which 14 cylinders compress air to operate two cylinders which supply motive power. No fuel needed, only lubricating oil — and a little patience, probably. The report states that the compressor cylinders force air into a storage tank, in which pressure of 200 pounds is maintained; but, by means of equalizers, the compressors "operate against only normal air pressure of 15 pounds." And incidentally, the motor has "an automatic counterbalanced crankshaft, turned from a solid steel round shaft."

Our vice president in charge of perpetual motion picked up these details and thought they should be passed along to you. We have half a mind (what an opening!) to get in touch with Radio's Bob Burns, the Arkinsaw raconteur, and see what he thinks about the matter. He knows the people down in that country. Throw away your physics books, men.

—SHRDLU

700 tons, state bridges, Indiana; bids March 10.

700 tons, plant addition for the Celenese Corp., Amcelle, Md.; bids asked.

600 tons, five bridges near Denver, for Denver, Rio Grande & Western railroad.

550 tons, lighthouse tender, Milwaukee.

550 tons, municipal filter plant, Cincinnati.

500 tons, 12-story building, Brooklyn, N. Y.; general contract to Park Slope Construction Co., 99 Wall street, New York.

458 tons, bridge near Greeley, Weld county, Colorado; bids March 3.

450 tons, high school building, Nashua, N. H.

425 tons, bridge and building, Great Lakes Exposition, Cleveland.

400 tons, pier No. 1, navy yard, Charlestown, Mass.; Bethlehem Steel Corp., Bethlehem, Pa., low.

400 tons, building, Ohio Bell Telephone Co., Cleveland; general contract to Lundoff-Bicknell Co., Cleveland.

400 tons, and 400 tons of rails, berth 155, Wilmington, Calif.; Wm. P. Neil Co. Ltd., Los Angeles, low.

375 tons, two state grade crossing elimination bridges in Tioga county, Pennsylvania; bids asked March 6.

365 tons, state highway bridge, Burlington, Vt.

350 tons, Mallets Bay road bridge, Burlington-Colchester, Vt.; bids open March 6.

300 tons, store, Cantley & Co., Tenth and Market streets, Philadelphia; bids asked.

300 tons, Capital City garage, Washington; bids asked.

300 tons, public school, B street and Allegheny avenue, Philadelphia; new bids to be asked March 6.

270 tons, including 54 tons of bars, Pony Truss bridge, Columbia county, Pennsylvania; bids March 20.

200 tons, state hospital buildings, Bangor, Me.; bids open March 5.

200 tons, medical and surgical building, Cranston, R. I.; general contract to Tucker Construction Co., Providence, R. I.

149 tons, bridge, near Montrose county, Colorado; bids March 3.

120 tons, repairing bridge, Trafford borough, Allegheny county, Pennsylvania; bids March 20.

115 tons, bridge, South Kingston, R. I.; general contract to F. T. Wescott, North Attleboro, Mass.

110 tons, extension to transit shed, pier No. 2, outer-harbor, Oakland, Calif.; bids March 2.

100 tons, overpass, North Kingston, R. I.; general contract to Seaboard Construction Co., Boston.

100 tons, Davisville bridge, S. Kingston, R. I.; general contract to Seaboard Construction Co., Boston.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 89

Second quarter bolt, nut, rivet prices have been reaffirmed. Demand is increasing and the market apparently is gaining strength. In announcing their price policy for the second quarter, producers state that no concessions will be granted to any class of buyers.

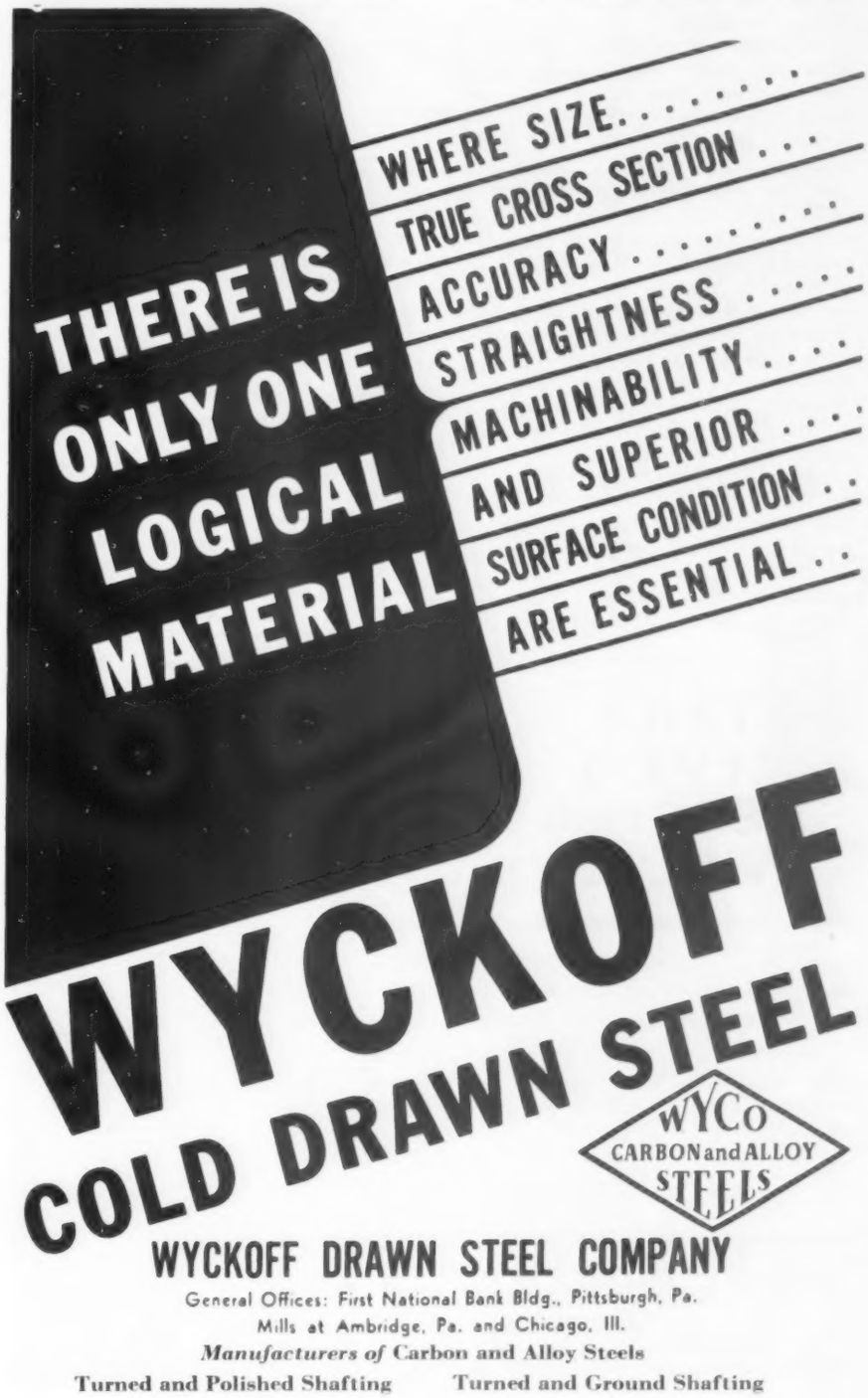
Railroads are increasing their purchases of bolts, nuts, and rivets, and further gains are indicated. Jobbers' purchases show little improvement, but demand from farm implement manufacturers at Chicago is the best in six or seven years.

At Cleveland, bolt and nut releases from automobile manufacturers in February were 25 to 30 per cent below January, but makers expect they will rebound to the January level this month. Jobbers are taking fairly large lots.

Reinforcing

Reinforcing Bar Prices, Page 89

New York—Orders dropped to almost nothing last week, the chief business placed involving 140 tons for highway bridges in New Jersey. New projects are developing slowly at the moment but the outlook for business in the next few months is considered good. There is a growing disposition to adhere to the quoted price of 2.05c base, Pittsburgh,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Turned and Ground Shafting

on new billet bars in cut lengths.

Pittsburgh—Sixteen producers bid for reinforcing bars for emergency shafts to be used in the Fort Peck, Mont., dam tunnels. Carnegie-Illinois Steel Corp., Laclede Steel Co., Youngstown Sheet & Tube Co., Bethlehem Steel Corp., Kilby Car & Foundry Co., Republic Steel Corp., Tennessee Coal, Iron & Railroad Co., Jones & Laughlin Steel Corp., Concrete Engineering Co., Sheffield Steel Corp., Missouri Rolling Mill Corp., and Inland Steel Co., were all low. The amount was 1616 tons of rounds ⅞-inch and smaller, and squares, 1¼-inch and smaller, the total being ten items. The companies mentioned bid 2.82c.

Cleveland—Competition continues keen for small lots of reinforcing bars, demand here being at a low ebb. Public works projects are maturing slowly.

Chicago — Producers announced that quotations of less than 2.10c for billet steel and 1.90c for rail steel will be withdrawn on all business not closed by March 1. This move is an attempt to restore stability to the market, which has been unsettled for a number of months. Sheffield Steel Corp. was low on 9000 tons of billet bars for Fort Peck, Mont., dam on a reported Chicago equivalent price of 1.75c. Moderation in weather will permit a resumption of building work, and a further increase in deliveries will be effected by the closing on work now pending. Chicago sanitary district has taken bids on 1050 tons of bars.

Boston—New work pending is featured by only two large lots, the Connecticut river bridge at Middletown, Conn., 920 tons, and a wharf for the Metropolitan Coal Co., Boston, 400 tons. Because of absence of tests, the market here is unchanged at 2.10c, base, Buffalo, on new billet stock, and 1.95c, base, Buffalo, on rerolled material, equivalent, respectively, to 2.46c and 2.31c, delivered Boston. Foreign steel can be had at less.

Philadelphia — Although actual awards continue light, sellers look for improvement in activity as spring approaches. There is a substantial accumulation of work awaiting only more favorable weather conditions. Prices appear steadier.

San Francisco—Bar awards aggregated 2047 tons, bringing the total for the year to 54,107 tons, compared with 25,086 tons for the corresponding period in 1935. Interest centers in the opening of bids on 9553 tons for tunnel work at the Fort Peck, Montana, dam.

Concrete Awards Compared

	Tons
Week ended Feb. 29	**5,080**
Week ended Feb. 22	**10,542**
Week ended Feb. 15	**1,979**
This week, 1935	**5,215**
Weekly average, 1935	**6,862**
Weekly average, 1933	**9,243**
Weekly average, February	**8,992**
Total to date, 1935	**48,112**
Total to date, 1936	**83,186**

Reinforcing Steel Awards

1700 tons, viaduct at Topeka, Kans., to Sheffield Steel Co., Kansas City, Mo.

1500 tons, dam at Fort Peck, Mont., to Laclede Steel Co., St. Louis.

800 tons, Niagara Falls sewage disposal plant, New York, to Recon Inc., Buffalo.

200 tons, Anderson dam, near Harrisburg, Pa., through Ganett, Eastman & Fleming, that city, general contractors, to Bethlehem Steel Corp., Bethlehem, Pa.; 185 tons of piling, Jones & Laughlin Steel Corp., Pittsburgh.

151 tons, highway work in Yellowstone county and at Missoula and Helena, Mont., to unnamed interests.

150 tons, postoffice, Santa Barbara, Calif., to Bethlehem Steel Corp., Bethlehem, Pa.

140 tons, two New Jersey state highway bridges, route 6, section 7, to Concrete Steel Co., New York, through James P. Burns, Dumont, N. J.

137 tons, seven bridges in Fremont county, Wyoming, to Concrete Engineering Co., Omaha, Nebr.

102 tons, highway work in Franklin and in Spokane county, Washington, to unnamed interest.

100 tons, Veterans Memorial building, Long Beach, Calif., to unnamed interest.

100 tons, addition to Ramona school, Alhambra, Calif., to unnamed interest.

Reinforcing Steel Pending

9000 tons, Fort Peck dam, Wiota, Mont.; Sheffield Steel Corp., Kansas City, Mo., low.

1050 tons, sewer work, Chicago; bids in.

797 tons, two tanks, Sacramento, Calif.; Campbell Construction Co., Sacramento, low on general contract.

600 tons, Northeast high school, Philadelphia; new bids March 6.

400 tons, Metropolitan Coal Co. wharf, Boston.

400 tons, public school, B street and Allegheny avenue, Philadelphia; new bids March 6.

250 tons, state highway bridges, Wisconsin, scattered locations; bids March 6.

176 tons, bridge at Bradley, Calif.; Peninsula Paving Co., San Francisco, low on general contract.

175 tons, Yankee stadium addition, New York; general contract to Leopold & Neckerman, New York.

157 tons, bridge near Greeley, Weld county, Colorado; bids March 3.

143 tons, under-crossing, Douglas, Ariz.; bids March 10.

129 tons, gymnasium, Placerville, Calif.; J. C. Meyers, low on general contract.

125 tons, berth 155, Wilmington, Calif.; Wm. P. Neil Co. Ltd., Los Angeles, low on general contract.

Unstated tonnage, bridge No. 2302 over Pine Run, South Oakland avenue, Sharon, Pa., 185 feet in length and with two 35-foot approach spans; bids to Mercer county commissioners, March 9.

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Braeburn (Pittsburgh District) Penna.

Pig Iron

Pig Iron Prices, Page 90

Pittsburgh—Books covering second-quarter shipments will be opened by district furnaces this week on an unchanged basis. Shipments are steady, but the carload-sized order is predominating and sizable river shipments are restricted by the weather. Rising scrap prices

are turning the attention of more melters to a heavier proportion of pig iron in their melt.

Cleveland — Sales are light, while shipments have increased moderately. As most of the tonnage being consumed in this quarter was booked before Jan. 1 producers will not benefit until second quarter from the $1 a ton advance, announced several months ago. Therefore, they are insisting that shipments on these contracts be cleaned up by April. 1.

Chicago—New business is increasing, and an acceleration in buying is in prospect for March, since stocks have been curtailed materially the past 60 days. Second quarter books are being opened, with prices unchanged. Foundry operations are steady, though little improvement has been shown lately in output of automotive castings. An early pick-up in the latter, however, is seen for this month.

Boston—With the approach of second quarter, some interests are beginning to consider their requirements and one melter has inquired for requirements over the rest of this year. Current melt is at least 10 per cent off, compared with January, due chiefly to the severe weather. A fair stock of Buffalo iron is on hand at Beacon, N. Y.

Mystic Iron Works, preparing to place its Mystic furnace back in production about April 1, will follow the practice just developed in the Middle West of supplying iron in the form of small pigs.

New York—Sellers look for increased specifications this month. Not only will seasonal conditions be more favorable, but there will be a disposition on the part of some sellers to specify more freely against old contracts made prior to the advance last November, and deliveries against which have been allowed to run over into this quarter. Shipments against these old contracts must be completed by March 31. As a result, second quarter prices, although representing reaffirmation of current quarter prices on new business, will represent an increase for a number of consumers.

Philadelphia—While sellers have opened books for the second quarter at unchanged prices, the quotations will represent an advance for those consumers who contracted heavily in October, prior to the price advance Nov. 1, and should result in improved specifications in March. Shipments against these old contracts will be permitted until March 31.

Buffalo—Sales continue to lag, and buying during February did not meet expectations. Carryover at the end of the year apparently was larger than anticipated, and some sellers think the balance of the quarter will be quiet. Local furnaces are preparing to ship iron by rail, to supplement their eastern storage stocks. Seven furnaces are blowing.

Cincinnati—Books will be opened for second quarter at unchanged prices. Ordering in small lots, and inquiries for iron up to 500 tons, are both increasing as melters' stocks dwindle and fourth quarter contracts, on which all tonnage must be taken by March 31, diminish.

St. Louis—Shipments picked up during the week, and indications point to a heavier total this month than in January. Buying is restricted to small lots for prompt delivery.

Birmingham, Ala.—Books for the second quarter are open, and the base price is unchanged. Prospects are bright for a steady second quarter business. Melters are taking advantage of more favorable weather, and are working on new contracts.

Toronto, Ont.—Merchant sales and inquiries are increasing. Awards for the week passed the 1200-ton mark, and further expansion is anticipated in the early spring. Prices are steady.

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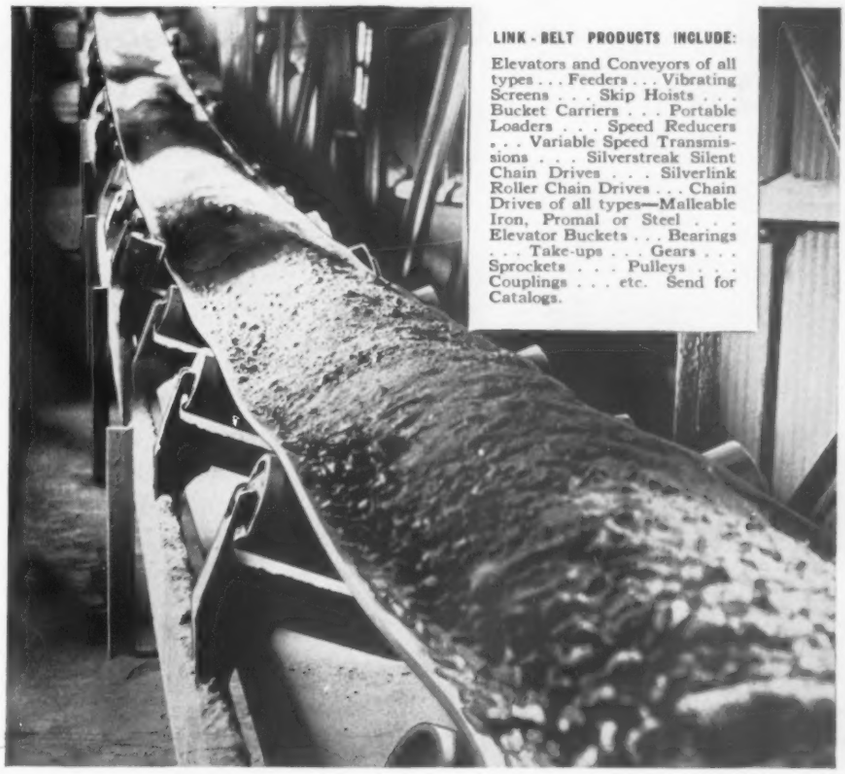

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Scrap

Scrap Prices, Page 91

Pittsburgh—The widest advance in several years sent scrap prices here up 50 to 75 cents a ton last week to a range of $15.50 to $16 for No. 1 steel, with the railroad grade at $16.50 to $17. A strong sellers' market is still in evidence and some mills have gone to distant midwestern points for supplies. Some 25,000 tons of scrap are offered for sale this week by the Pennsylvania railroad, including 9550 tons of No. 1 heavy melting steel.

Cleveland—Further strength has been added to the northern and eastern Ohio scrap markets by substantial price advances at Youngstown and Cleveland. No. 1 heavy melting steel has risen $1.50 a ton at Cleveland and $1 at Youngstown. Other grades have advanced 25 to 75 cents a ton. Available scrap is scarce but shipments are improving.

Chicago—Despite moderation in the weather and an increase in supplies of scrap, prices are holding recent gains. Heavy melting steel continues $14.50 to $15, following mill purchases at the latter figure. With scrap consumption well maintained and fairly heavy orders outstanding, the district is expected to be able to absorb a further increase in scrap offerings without weakening prices.

Boston—Iron and steel scrap yards have recovered from cold weather but are working slowly. Consumers continue to meet requirements out of stock. The melt is at least 10 per cent below that of January. A boat now is being loaded, largely with No. 1 and No. 2 steel, for export.

New York—Dealers' buying prices are mounting rapidly and indifference by certain interests for the past few weeks has disappeared. Little scrap is coming out, while consumers, particularly in eastern Pennsylvania and the Pittsburgh district, are anxious to have shipments. As a result, dealers are trying energetically to make shipments.

Philadelphia—Milder weather has caused some loosening up in shipments and has taken the edge off prices of certain leading grades. For instance, in No. 1 steel some business has been done at as high as $14.50, delivered consuming plant, but more recently tonnage has been rejected by two district consumers at $13.50.

The market on this grade is still relatively strong, and for the moment $13.50 to $14 appears fairly representative. But steel prices are badly in need of a test, which may come shortly with the entrance of two leading consumers. In No. 2 steel, better weather is expected to prove specially beneficial.

Buffalo—Local dealers continue to ship iron in tonnage to other consuming centers but have been unable to make deals locally. The district price is now based on the worth of scrap for shipment to other centers rather than on any local bid. All prices are strong and specialties continue to establish new highs in new contracts.

Cincinnati—A break in severe weather may clarify the iron and steel scrap market. Melters have bought only miscellaneous offerings recently but take material steadily on contracts. Although strong, quotations are nominally unchanged.

St. Louis—The main development in iron and steel scrap was the purchase by an east side mill of 10,000 tons for delivery over the next 60 days. The price was said to have been that currently quoted, $1.50 per ton higher than the last preceding purchase by this interest. The business was divided among several dealers.

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TARENTUM, PA. (PITTSBURGH DISTRICT)

Warehouse

Warehouse Prices, Page 92

Cleveland—Warehouses here have reduced wire nails from 2.60c to 2.40c, and fence wire from 2.65c to 2.45c, base. Cold rolled strip also has been reduced from 3.00c to 2.85c. Other prices are unchanged.

Chicago—Sales continue ahead of the rate a year ago, while February business was practically equal to that of January. Price revisions await announcement by mills regarding second quarter quotations.

Boston—Declines in mill prices on sheets and strip steel have not affected delivered prices quoted by jobbers on warehouse shipments here. In general, prices are firm. The only weakness is in foreign steel bars and shapes, which continue to sell substantially lower than domestic.

New York—Jobbers are disturbed by the recent reduction of $3 a ton in the mill prices on sheets and strip. This has further accentuated competition for galvanized sheet business. Business appears to be up slightly in the daily average, as compared with January, and jobbers expect a further increase in March.

Philadelphia—According to some leading jobbers, the past few days have seen more activity than in several weeks. This is attributed at least in part to milder weather conditions. March is expected to be a good month. Prices are unchanged.

Detroit—February's specifications and shipments for jobber steel averaged 10 to 15 per cent less in volume than those of January. The market is hampered mainly by bad weather. Aside from unsettlement on resale sheet and strip seconds, jobbing prices are steady.

Cincinnati—February sales from warehouses reached a volume about equal to January. Some early inquiries give hope of releases this month of building materials, chiefly in small individual orders. Prices are firm.

St. Louis—Business picked up sharply during the past week, due chiefly to more favorable weather. Coal mines have been heavy buyers, railroads are accounting for sizable lots, and seasonal gains are noted in demand from the general manufacturing trade.

Quicksilver

New York—Quicksilver prices are steady here in a generally quiet market. Some sellers quote up to $89 a flask on small lots. Lots of 15 to 25 flasks are firm at $78 to $79, and supplies are still limited.

Ferroalloys

Ferroalloy Prices, Page 90

New York—Ferromanganese shipments show little change, keeping pace with ingot production. Prices are holding at $75, duty paid, Atlantic seaboard, and there is little likelihood of change until at least the next quarter, for which position sellers probably will open books about the middle of March. At the moment there is nothing to indicate a price

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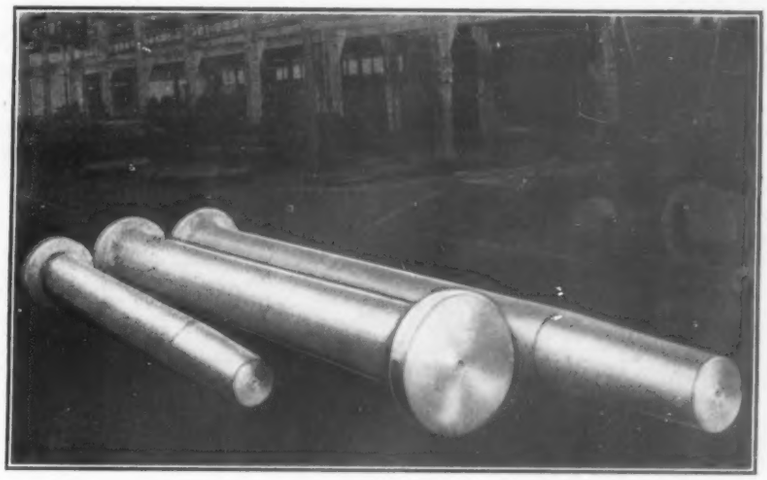

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revision. Domestic spiegeleisen, 19 to 21 per cent, is steady at $26, Palmerton, Pa., on lots up to 50 tons, and $24 on 50 tons and over.

Coke By-Products

Coke By-Product Prices, Page 89

New York—First of a number of expected price advances on coal tar products has materialized in sulphate of ammonia. This material is up $1 to $25, per net ton, in bulk, in carloads, f.o.b. Atlantic and Gulf ports. Supplies of industrial xylol, solvent naphtha and naphthalene continue short. In general, demand for coal tar products is increasing.

Metallurgical Coke

Coke Prices, Page 89

Though metallurgical coke prices hold firmly at $3.50 to $3.75 on beehive furnace grade, $4.25 for common foundry and $5.50 for premium foundry, all f.o.b. Connellsville, Pa., ovens, these prices show no early tendency to advance. This is due to the proportionately heavier demand for coke and coal in domestic sizes, on which producers are still operating with a heavy backlog.

By-product coke shipments show gains over January rate, except in New England where some shrinkage has been noted. Prices are being reaffirmed for March at the prevailing level.

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Iron Ore

Iron Ore Prices, Page 91

Cleveland—Inquiries for Lake Superior iron ore have not yet appeared, although Ford Motor Co. is expected in the market shortly for a large tonnage. Producers have not determined on prices for this season. Prices have been unchanged for the past seven years. Lake Superior Iron Ore association's current report on iron ore:

	Tons
Consumed in December	3,100,530
Consumed in January	2,951,568
Decrease in January	148,962
Consumed in January, 1935	2,280,393
On hand at furnaces Feb. 1, 1936	23,434,494
On Lake Erie docks Feb. 1, 1936	4,969,841
Total at furnaces and Lake Erie docks Feb. 1, 1936	28,404,335
Total Feb. 1, 1935	32,027,268

Philadelphia—Approximately 1000 tons of chrome ore from British India in storage in Philadelphia has been sold to Italy. The material was brought in by an importer as a portion of a cargo of chrome ore, which, it is said, was received in Philadelphia early in February.

Steel in Europe

Foreign Steel Prices, Page 92

London — (*By Cable*) — Dormen, Long & Co. Ltd. has restarted two Middlesbrough blast furnaces, mainly for steelmaking iron. Scarcity of foundry iron is increasing and hematite domestic prices have been increased 6s. It is reported 1000 tons of hematite has been sold for export to the United States. Steelmakers are fully booked and prices of billets, bars and structurals have been increased for the home market. Domestic demand for galvanized sheets is fair but for export it is dull. Trade in tin plate is improving.

The Continent reports conditions are more active, especially in export of semifinished steel to Great Britain and ship plates overseas. Belgian domestic trade is improving.

Convention Calendar

March 2-6—American Society for Testing Materials. Spring group meeting of committees at William Penn hotel, Pittsburgh. C. L. Warwick, 260 Broad street, Philadelphia, is secretary.

March 3-6—American Management association. Sixth packaging conference and exposition at Hotel Pennsylvania, New York. Alvin E. Dodd, 20 Vesey street, New York, is executive vice president.

March 4—American Society for Testing Materials. Regional meeting at William Penn hotel, Pittsburgh. C. L. Warwick, 260 Broad street, Philadelphia, is secretary.

March 16-18—National Association of Waste Material Dealers Inc. Annual convention at Hotel Astor, New York. Charles M. Haskins, 1109 Times building, New York, is secretary.

March 29-April 4—American Ceramic society. Annual convention and exhibit at Columbus, O. Ross C. Purdy, 2525 North High street, Columbus, O., is secretary.

Nonferrous Metals

Nonferrous Metal Prices, Page 90

New York—A strong upward tendency developed in major nonferrous metal prices last week. Advances of $2 per ton in lead and $1 in zinc were made on active demand while Straits tin rose sharply on scarcity of supplies. Copper held quotably unchanged but strong.

Copper—Several sellers continued to ask 9.50c, Connecticut, for electrolytic but the going market remained at 9.25c. The determined stand of both groups of sellers pricewise left the outcome uncertain. Sales held up fairly well.

Lead—Continued heavy buying contributed directly to two price advances of five points each. Demand was well diversified among leading consumers. Lead closed at 4.45c, East St. Louis, and 4.60c, New York, with St. Joseph Lead Co. asking $1 premium on the latter market at 4.65c.

Zinc—Statistical strength of the zinc market which had been accumulating but held in check due to comparatively low levels in London was released as the market firmed abroad. Prices advanced five points to 4.90c, East St. Louis. Sales were heavy prior to the price rise but tapered at the higher level. A moderate increase in buying now likely would result in a further advance.

Tin—Straits tin prices stiffened on scarcity of supplies here and in London and on signs of renewed buying from consumers in the immediate future. Spot closed around the 49-cent level compared with 46.12½c at the end of the previous week.

Antimony—Prices eased due to weakness of the market in China. Chinese spot was quoted nominally 13.25c, duty paid, New York, while American spot dropped to 12.87½c, New York.

Equipment

Chicago—Plant equipment sales show gains in some instances. Machine tool orders, while not so active as in January, have been heavier lately. Inquiries remain in fair volume and point to a continuation of relatively heavy business during the near future. Railroads still are financially unable to spend heavily for shop equipment and are issuing few inquiries for new machines despite better operations at car shops. Best demand for machine tools is coming from miscellaneous users. Foundry equipment sales are holding well.

New York—Marked improvement has followed the recent slight recession in demand for machine tools. For the first time, buying for expansion of manufacturing capacity is becoming important. Export demand has increased and this market is featured by inquiry from England for certain tools on which the English makers cannot give satisfactory delivery. General Electric Co. is improving its turbine department at Schenectady, N. Y. New Departure Mfg. Co. has just purchased some 50 modern tools for its Meriden, Conn., plant. Westinghouse Electric & Mfg. Co. is in process of modernizing its electric refrigerator unit at Springfield, Mass. Air Reduction Co. is about to launch a purchasing program in connection with important expansion of its manufacturing facilities at Jersey City, N. J. An interesting development is the increase in demand for shears and allied equipment for use in slitting wide strip steel into narrow widths.

Detroit—New by-products recovery equipment for the coke oven department of the Ford Motor Co. Rouge plant is being installed, at a cost of $500,000. This plant has also matured plans for handling greatly increased quantities of fuel gas, involving construction of a 10,000,000-cubic foot gas holder, installation of a propane gas mixing station, and improvement and enlargement of pipelines.

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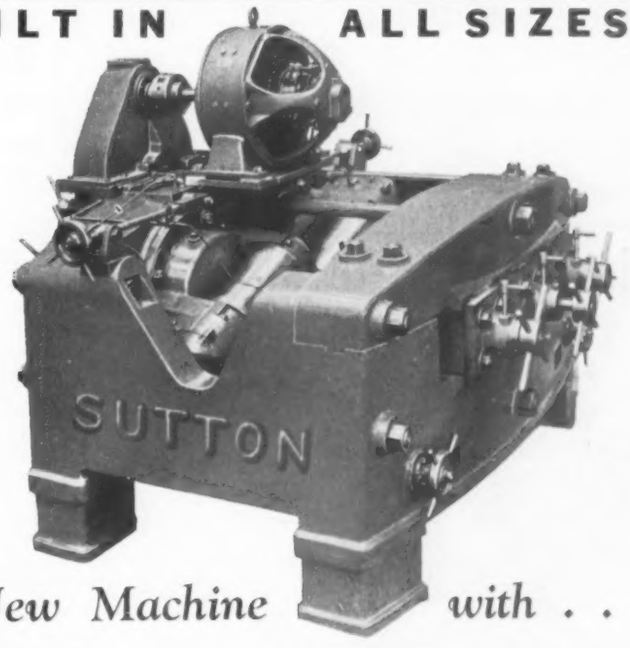

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Construction and Enterprise

Ohio

CLEVELAND—City has adopted emergency ordinance 103748 calling for purchase of 1000 outdoor electric meter receptacles and accessories.

CLEVELAND—McKinney Tool & Mfg. Co., 1688 Arabella road, is taking bids for a 2-story, 80 x 100-foot brick and steel factory building addition. E. G. Hoefler, 5005 Euclid avenue, is engineer.

CLEVELAND — Modern Mfg. Inc., 4734 Hough avenue, maker of paper hanging equipment, has been incorporated by Ralph A. O'Reilly, Joseph Novotny and Gordon C. Locke. Mr. Locke, 600 Hickox building, is correspondent.

CLEVELAND — City, division of light and power, room 105, city hall, is contemplating asking bids for one battery charging motor generator, one pipe threading machine, one truck winch and power takeoff, and miscellaneous electrical equipment.

CLEVELAND — City, division of light and power, room 105, city hall, is contemplating improvements in the East Fifty-third street light plant, including replacing superheaters in three boilers and retubing superheaters in two boilers, ordinance 103728; replacing soot blowers and piping on boilers No. 7, 8, 13 and 14, ordinance 103729; replacing safety valves and piping on boilers, ordinance 103730; repairing steam drums on boilers No. 7, 8 and 9, ordinance 103734; equipping steam-flor-airflow meters on all boilers, ordinance 103735.

COLUMBUS, O. — United States quartermaster, supply officer, general depot, will receive bids until March 17 circular No. 2, on warehouse equipment, including conveyors, elevators, and industrial trucks.

DAYTON, O.—United States air corps, contracting officer, materiel division, Wright field, will receive bids until March 5 for a gear-driven liquid pump, circular 36-597.

DAYTON, O.—United States air corps, materiel division, Wright field, will take bids until March 16 for miscellaneous parts for Liberty engines, aeronautical equipment, shop equipment and machine and hand tools.

DAYTON, O.—United States air corps, contracting officer, materiel division, Wright field, will receive bids until March 5 for two gear-driven, pumps, proposal 597; until March 6 for one motor-driven grinder, and two motor-driven diamond tool wheel and tail stock wench, complete with valve facing attachment, circular 598.

ELYRIA, O.—I. D. Faxon, city safety service director, is considering purchase of an air compressor for street and waterworks departments. Estimated cost is $2500.

FINDLAY, O.—S. E. Furst, city service director, has been authorized to sell pumps, boilers and other equipment in the Cherry street station, now being razed.

NORWOOD, O. — City, Allen C. Roudebush mayor, L. A. Gillette WPA director for district No. 16, has appropriated $25,000 for the purchase of construction equipment, including an air compressor and dump trucks.

NILES, O.—Niles Iron & Steel Roofing Co., Warren avenue, Earl Hughes president, sustained damages by fire to its factory building including equipment on Feb. 18.

SEBRING, O. — Village council has authorized John A. Reddy clerk, to obtain estimates on the cost of a proposed survey for a municipal light plant.

TOLEDO, O.—Pure Oil Co., Otter creek road, O. B. Wendeln superintendent, has awarded a contract to the Lummas Co., New York, for the construction of a topping, cracking and refining plant in the East Bay Shore district, at a cost of $750,000. Work is to be completed by June 30.

WOOSTER, O.—City, George Allspaugh service director; H. P. Jones Co., Second National Bank building, Toledo, O., consulting engineer, is working on a survey of a contemplated $100,000 sewage disposal plant.

Michigan

ANN ARBOR, MICH.—Ayres, Lewis, Norris & May, Ann Arbor, engineers, are preparing preliminary plans for the erection of a water softening and filtration plant here.

BATTLE CREEK, MICH.—Postum Co. will make an addition to its power house at a cost of $80,000, including new equipment.

DETROIT—Edgewood Tool & Mfg. Co., Robert F. Fischer Jr., 1525 Crane avenue, has been incorporated to design tools, jigs and dies.

DETROIT—Reska Spline Products

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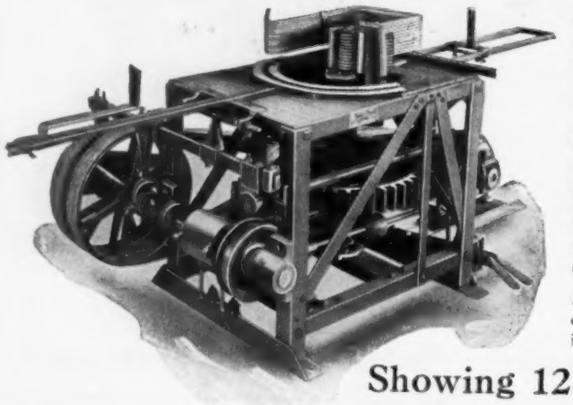

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Minneapolis, Minn.

Co., Harry L. Green, 233 Woodward avenue, has been incorporated to manufacture tools.

DETROIT—General Body Corp., Martin Menton, 129 West Hildale avenue, has been incorporated to deal in automobile bodies.

DETROIT — Michigan Valve & Foundry Corp., 3631 Parkinson avenue, has been incorporated to engage in a general manufacturing business.

DETROIT—Timken Silent Automatic Corp. and the Timken Detroit Axle Co., 100 Clark avenue, have been incorporated for general manufacturing purposes.

JACKSON, MICH.—Acme Industries Co.'s plant was destroyed by fire on Feb. 7.

LANSING, MICH. — Scissor Grip Products Co. Inc., W. Dean McKale, 616 Williams street, has been incorporated to deal in automobile parts.

MUSKEGON, MICH.—Naph-Sol Refining Co., Herbert J. Conn president, building program, including construction of an office building and a new boiler plant.

NORTHVILLE, MICH.—Lyndon & Smith, Detroit architects, are preparing working drawings for a school building and power house, to be erected here to replace units destroyed by fire sometime ago.

PLYMOUTH, MICH.—Pentagon Refining Co., Herbert J. Conn, president, Alex Lindsay secretary, is building a plant four miles east of here.

PORT HURON, MICH.—City has been ordered by State Stream Control commission to complete plans and start construction by June 1, 1938, on a sewage disposal plant. Estimated cost is $675,000.

SAGINAW, MICH.—North American Petroleum Co., which recently took over the Peerless skimming plant here will enlarge the plant before beginning production operations.

SAGINAW, MICH.—Saginaw Steering Gear Co. has completed private plans for erection of an addition to the plant to house the shipping room and loading dock.

ST. LOUIS, MICH.—McClanahan Refineries Inc. has started construction of a Dubbs reforming unit. It is designed to permit future addition of a two-coil unit.

Illinois

BRADLEY, ILL.—J. H. Watson Co. has under consideration erection of a $55,000 metal stamping plant.

CHICAGO—Polhemus Co. Inc., 2400 West Madison street, has been incorporated by G. Jules and Hanna A. Polhemus, with Glenn L. Powers, 2400 West Madison avenue, correspondent. The company will deal in general machinery business.

CHICAGO — Art Brass Foundry Inc., 506 South Green street, has been incorporated by Oscar A. Hansen, Helen and Goodman E. Olson, to operate a general foundry and machine business. William S. Collen, 208 West Washington street, is correspondent.

CHICAGO — Universal Vacuum Products Co., 1800 North San Francisco avenue, Fricke & DeBusk, 1237 Monadnock building, correspondent, has been incorporated by Alexander E. Begole, Joseph J. Hegar and Leslie W. Fricke, to establish plants for the manufacture of workshop equipment and machinery.

CHICAGO — Universal Wheel & Abrasive Co., 1330 West Jackson boulevard, has been incorporated to deal in sharpening stones, grinding wheels, etc. Robert H. Olson, Margaret Hyde, and Stephen Kauth are the incorporators. Harry A. Biossat, 1525 Chicago Temple building, is correspondent.

CHICAGO — General Machine & Equipment Corp., 38 South Dearborn street, has been incorporated to deal in machinery, equipment and general merchandise. Jacob G. Block, Paul F. Kessler and Morton A. Mergentheim are the incorporators. Mergentheim and Sharf, 38 South Dearborn street, are correspondents.

PEORIA, ILL.—Capt. S. N. Karrick acting United States engineer, Chicago, announces that purchase of a 15-ton power derrick for maintenance work on the Illinois river has been approved by Secretary of War Dern. Cost is estimated at $62,500.

Indiana

CRAWFORDSVILLE, IND. — Board of public works, C. D. Jones clerk, is considering construction of a sewage disposal plant, estimated to cost $180,000. C. Hurd, 1039-41 Architects building, Indianapolis, is consulting engineer.

GARY, IND.—Carngie-Illionis Steel Corp., Carnegie building, Pittsburgh, has plans for the construction of a normalizing unit for the steel rail mill at Gary. Cost estimated at $300,000.

INDIANAPOLIS—Board of trustees, Madison State hospital, North Madison Ind., will receive bids until March 3 at the office of J. M. Rotz Engineering Co., 817 Merchant Bank building, Indianapolis, for water softening equipment.

INDIANAPOLIS—City, F. M. Logan acting PWA manager in Indianapolis, has awarded a contract to Max Irmscher & Sons, Ft. Wayne, Ind., for an addition to the municipal electric light plant, and installation of new boilers on a bid of $75,400. This is part of a $125,000 improvement program.

INDIANAPOLIS—Pirrung Inc. 34 West Thirteenth street, Indianapolis, Joseph Thompson resident manager, has been incorporated to manufacture engine and automobile parts. Gilbert Pirrung, Lewis W. Devore, and Mr. Thompson are the incorporators.

Massachusetts

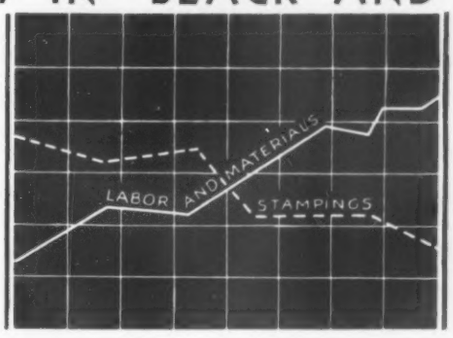
GARDNER, MASS.—Florence Stove Co. will purchase a 40 per cent interest in the Wehrle Co., stove manufacturer, at Newark, O., and Lewisburg, Tenn., and the Wehrle die shop at Coshocton, O. Operating facilities of the Wehrle Co. are to be expanded. Cost of the purchase will be $660,000. R. L. Fowler is president of the Florence company.

New York

BUFFALO—Eastman Machine Co., 779 Washington street, H. E. Plumber and associates, 775 Main street, engineers and architects, is considering an improvement program involving an expenditure of $37,000, including equipment.

CONCORD, N. Y. — Public service commission has granted the town of Concord a petition for the extension of

A STUDY IN "BLACK AND WHITE"



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the electric lines of the village of Springville, N. Y.

Connecticut

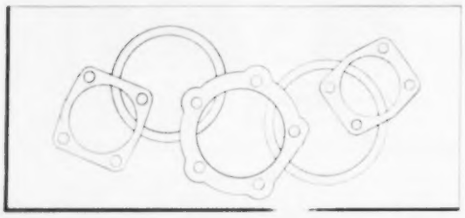
EAST HARTFORD, CONN—National Oil Corp., Riverside drive, is planning the erection of a power plant, installation of new equipment, construction of a garage and office at a cost of $40,000.

Pennsylvania

MIDLAND, PA.—Treadwell Construction Co. has been awarded a contract for the construction of a diesel-powered steel dredge. The dredge, together with a stacker ladder, necessary winches and pumps, will cost $500,000.

NEW BRIGHTON, PA.—Borough, town council, Margaret Eppers Colbert secretary, will receive bids until March 11 for one rebuilt 3-wheel 10-ton gasoline roller and one rebuilt air compressor having 120 cubic foot capacity.

PITTSBURGH—Pittsburgh Coal Co., Oliver building, here and the United States Steel Corp., 71 Broadway, New York, have affected a swap of about $12,000,000 worth of coal mining properties. This places the coal company, headed by J. D. A. Morrow, in the market for approximately $750,000 for new equipment.



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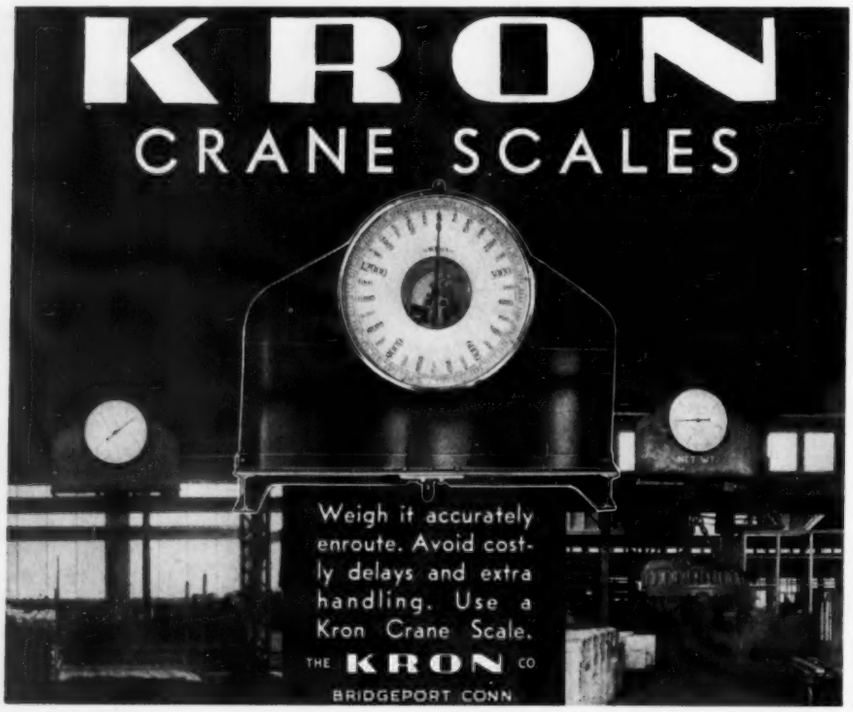
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Alabama

ANNISTON, ALA. — Dr. William Gray Mehard, Anniston, has applied to the federal power commission for a preliminary permit for the installation of a 1000 horsepower plant at United States lock and dam No. 2 on Coosa river in Calhoun county.

BIRMINGHAM, ALA. — W. M. Smith & Co., dealer, First avenue, North, is asking for concrete mixers, small air compressors and miscellaneous contracting equipment.

BIRMINGHAM, ALA.—Sanborn & Bogart, 30 Church street, New York, has been appointed consulting engineer by J. D. Webb city engineer, chairman of the engineering commission, for the $5,800,000 industrial water supply system.

Maryland

BALTIMORE—Pennsylvania railroad, S. Danby, division engineer, Pennsylvania station, plans rebuilding a coal tipple at Orangeville, recently damaged by fire.

BALTIMORE — Steel & Tin Products Co. Inc., L. B. Meacham president, 2100 Aliceanna street, is negotiating for a building at President and Fawn streets The building is to be altered.

District of Columbia

WASHINGTON—Veterans' administration, construction service, 764 Arlington building, asks bids for construction of a water softening system in North Chicago, Ill., on project 943.

WASHINGTON—Navy department, bureau of supplies and accounts, will ask bids March 3, schedule 7285, on a motor-driven miller and shaper, delivered Brooklyn, N. Y.; March 6, schedule 7256, on a motor-generator set, delivered Washington; March 10, schedule 7274, on two semi-automatic thread milling machines, delivered Washington.

Kentucky

LOUISVILLE, KY.—Joseph E. Seagram & Sons Inc., liquor distiller, 405 Lexington avenue, New York, will install $2,000,000 in equipment in 23 buildings being erected at a cost of $4,000,000.

Florida

CLEARWATER, FLA. — Board of Pinellas county commissioners, John C. Blocker attorney, has accepted the offer of PWA to finance a $275,000 waterworks project for lower Pinellas gulf beaches.

Georgia

ROSWELL, GA.—Town, G. N. Rucker mayor, receives bids until March 16 for construction of a water treatment plant. Wiedeman & Singleton, Candler building, Atlanta, Ga., is consulting engineer.

VALDOSTA, GA.—Georgia Power & Light Co. plans expenditure of $109,000 for rural electrification program. All supplies and equipment are to be standard make and furnished under competitive bidding.

Louisiana

LAKE CHARLES, LA. — Shutts & Sons, Lake Charles, is designing a terminal here for Continental Oil Co., Oklahoma City, Okla., to include loading docks, 80,000-barrel storage tank and

a diesel-powered centrifugal loading pump having capacity of 10,000 barrels per hour.

NEW ORLEANS — Sewage and water board will receive bids until April 2 on PWA project No. 4284. Plans and specifications will be obtainable March 2 from A. G. Moffat, secretary, and Alfred F. Threand general superintendent, for schedules No. 211S, 212S and 213S for construction of sewage pumping station, for pumps, motors, and transformers.

SHREVEPORT, LA. — Shoreline Refining Co. is considering installation of a cracking unit and other equipment at the Lewis, La., plant at a cost of $200,000.

North Carolina

CANTON, N. C.—Town, J. L. Reeves mayor, has filed an application to the PWA for funds to construct a $150,000 waterworks. Harwood and Beeke, Spartanburg, S. C., are consulting engineers.

CHARLOTTE, N. C. — Southern Chemical Corp., John L. Crist president, 1042 Ardsley road, will start work soon on a $100,000 plant for the manufacture of dyestuffs and textile chemicals.

CONCORD, N. C.—City has a loan of $101,000 and a grant of $82,000 for waterworks.

GASTONIA, N. C.—Plants of the Gastonia Brush Co. and the Gastonia Roller & Spindle Co. have been damaged by fire. C. E. G. Honeycutt is owner and manager.

GOLDSBORO, N. C.—Sal Esposito Packing Co., Miami, Fla., plans establishing a packing plant here. E. B. Gaskin is the company's representative.

JACKSON, N. C.—Town, E. B. Grant mayor; Spoon & Lewis, engineers, Greensboro, N. C., will receive bids until March 6 for furnishing materials, equipment and labor necessary for the construction of water supply and sewerage systems. Projects include 75,000 gallon elevated tank on 100-115-foot tower.

MORVEN, N. C.—City, Paul M. Van Camp engineer, Southern Pines, N. C., plans a $38,000 waterworks, including pumping plant, and installation of pumping equipment.

MOUNT PLEASANT, N. C.—A loan of $48,000 has been received by the city, in addition to a $39,000 grant for waterworks and sewers.

MOUNT PLEASANT, N. C.—City, H. A. Meese clerk, Gilbert C. White Co., Durham, N. C., consulting engineer, will let contract about March 15 for $87,000 improvements to the waterworks, including erection of a 100,000-gallon tank.

ROCKY POINT, N. C. — City, William C. Olsen consulting engineer, Raleigh, N. C., receives bids March 19 for furnishing and delivering and/or erecting power plant equipment, including boiler, 450-pounds operating pressure, superheater for maximum temperature of 750 degrees Fahr., and underfeed stoker.

South Carolina

YORK, S. C.—E. B. Lowry and C. J. Youngblood have acquired and plan to reopen Travora Cotton mills. Purchases may include 5000 spindles for manufacture of knitting yarn.

West Virginia

BARBOURSVILLE, W. VA.—Chesapeake & Ohio railroad, Terminal Tower, Cleveland, suffered damage to three buildings at the reclamation plant here. The pattern, machine, and blacksmith shops also were damaged. E. L. Bock is general superintendent.

HOLDEN, W. VA.—Island Creek Coal Co. will build a steel tipple along the Kanawha river here to facilitate coal loading into barges. Including machinery purchases, cost of the improvement is estimated at $80,000.

LOGAN, W. VA.—Guyan Machinery Co., dealer, is asking for a wheel press with 100 to 150-ton capacity arranged for motor drive; 200 to 300 kilowatt, 275 to 2300-volt direct current rotary converters; a 40-horsepower engine operated by natural gas; and 200 to 300 kilowatt, 275 to 2300 volts, direct current motor generator sets.

WINFIELD, W. VA.—Kanawha Valley Co., W. H. Wheelwright, 1632 Virginia street, Charleston, W. Va., has been granted authority by federal power commission to construct $3,000,000 hydroelectric power project on Kanawha river. Project is to be started May 1. Plans call for installation of 26,000-horespower capacity in four units of 6500 each.

(*Please turn to Page* 115)

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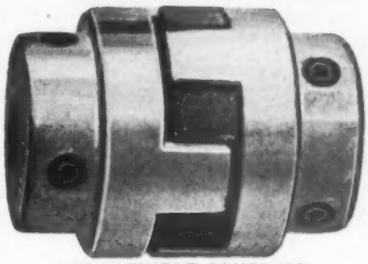

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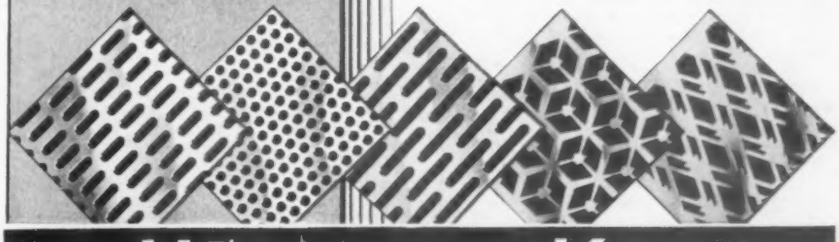

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Norton Co., Worcester, Mass.

ABRASIVES (Wire Cleaning)
Industrial Silica Corp., 602 Stambaugh Bldg., Youngstown, O.

ACCUMULATORS
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ACETYLENE
Air Reduction Sales Co., 60 East 42nd St., New York City.
Linde Air Products Co., 30 E. 42nd St., New York City.

ACID-PROOF LININGS
Ceilcote Co., The, Rockefeller Bldg., Cleveland, O.

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American Chemical Paint Co., Ambler, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

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Ross, J. O., Engineering Co., 350 Madison Ave., New York City.

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ANGLES, CHANNELS—See BEAMS, CHANNELS, ANGLES

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Excelsior Tool & Machine Co., Ridge and Jefferson Aves., East St. Louis, Ill.

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The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

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Standard Steel Works Co., Burnham, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

BABBITT METAL
Cadman, A. W., Mfg. Co., 2815 Smallman St., Pittsburgh, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
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BANDS—See HOOPS AND BANDS

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Bethlehem Steel Co., Bethlehem, Pa.
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Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.

BAR BENDERS
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.

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American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
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Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.

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Timken Steel & Tube Co., Canton, O.

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Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

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*Ludlum Steel Co., Watervliet, N. Y.
*Midvale Co., The, Nicetown, Philadelphia, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., Canton, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

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Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., Los Angeles, Cal.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
*Jessop Steel Co., Washington, Pa.
*Ludlum Steel Co., Watervliet, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BEARINGS (Ball)
Bantam Ball Bearing Co., The, South Bend, Ind.
Boston Gear Works, Inc., North Quincy, Mass.
Fafnir Bearing Co., New Britain, Conn.
Norma Hoffmann Bearings Corp., Stamford, Conn.
New Departure Mfg. Co., Bristol, Conn.

BEARINGS (Bronze)
Shoop Bronze Co., The, 344-360 W. Sixth St., Tarentum, Pa.
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.
Shenango-Penn Mold Co., Dover, O.

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Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Oilless)
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.

BEARINGS (Radial)
Bantam Ball Bearing Co., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
New Departure Mfg. Co., Bristol, Conn.
Timken Roller Bearing Co., Canton, O.

Bearings (Roll Neck)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Roller)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Norma Hoffmann Bearings Corp., Stamford, Conn.
S K F Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.
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Bantam Ball Bearing Co., South Bend, Ind.
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Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
Norma Hoffmann Bearings Corp., Stamford, Conn.
Shoop Bronze Co., The, 344-360 W. Sixth St., Tarentum, Pa.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Quill)
Bantam Ball Bearing Co., South Bend, Ind.

BEARINGS (Thrust)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Norma Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., The, Canton, O.

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Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Morgan Engineering Co., The, Alliance, O.
Thomas Spacing Machine Co., Pittsburgh, Pa.

(Concluded from Page 113)

Virginia

HOPEWELL, VA.—Hummel-Ross Fibre Corp.'s finishing room at the Hopewell paper plant was damaged by fire recently.

POUND, VA.—Board of supervisors of Wise county, court house, Wise, Va., will receive bids until March 12 for a waterworks system for the Pound sanitary district. Wiley & Wilson, Lynchburg, Va., are consulting engineers. PWA project, docket No. 7421.

PULASKI, VA.—Johnston Roller mills in West Pulaski were damaged by fire recently.

RADFORD, VA.—Lynchburg Foundry Co., Lynchburg, Va., C. Harold Owen secretary, plans construction of a new shop at the Radford plant at a cost of $420,000. The building will be 372 feet long and will house casting, annealing and cleaning departments. Pipe will be cast by the centrifugal process. New machinery is to be installed.

RICHMOND, VA.—Virginia Electric & Power Co. plans expenditure of $3,875,892 in 1936, including $134,000 for new steam boilers for the Norfolk gas plant.

Missouri

GREENFIELD, MO. — Dade County Mining Co. Inc., E. W. Nagel president-treasurer, will award contracts for pulleys, line shaft, air compressors, jack hammer drills, well pump and engine, as part of the program of constructing a zinc mill.

JEFFERSON CITY, MO. — The state, Capital building, W. D. Wideman, Hall building, Kansas City, Mo., consulting engineer; and C. A. Haskens, 406 Capital building, Jefferson City, supervising engineer, is planning construction of a filtration plant and distributing system for the Missouri State penitentiary here. Estimated cost is $100,000.

SENECA, MO.—City, Dr. Earl Pollock mayor, Albert C. Moore, Joplin, Mo., consulting engineer, plans disposal plant and sanitary sewer system costing $50,000.

ST. LOUIS — St. Louis Spring Co.'s plant at 3139 Washington boulevard, was damaged by fire recently.

ST. LOUIS — Mississippi Valley Equipment Co., 511 Locust street, is asking for a 5000 to 6500 cubic feet, steam driven air compressor, suitable for 60-pound or higher pressure.

ST. LOUIS—Busch-Sulzer Bros.—Diesel Engine Co. has been incorporated in Michigan. The Corporation Co., Dime Bank building, Detroit, is correspondent.

Arkansas

CARLISLE, ARK.—Farrar-Lowe Implement Co. has been formed by H. E. Farrar, Carlisle, Ark., and T. J. Gay, Little Rock, Ark.

EL DORADO, ARK. — City, George R. Crosley mayor, has applied to PWA for loan of $575,000 for constructing a light plant.

LITTLE ROCK, ARK.—City, John A. Sherrill project attorney, has taken over the plant of the Arkansas Water Co., and bonds totaling $6,290,000 have been issued to pay for the company's properties and to construct a water supply system. Marion L. Crist and Chester A. Smith, engineers for Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., will resume work on the project.

Oklahoma

PAWHUSKA, OKLA.—City has issued $37,000 in bonds for power plant.

PAWHUSKA, OKLA.—City has the approcal of Mac Q. Williamson attorney general, for the issuance of $37,000 light plant bonds.

VINITA, OKLA.—Albert C. Moore, Joplin Mo., consulting engineer, has plans in progress for complete sewage disposal plant, pumping station, settling tanks, sludge digestion, resettling tanks. City may vote on bonds after May 1 for a power and light plant, distribution system and generating plant.

WEBB CITY, OKLA. — A battery of 20 tanks of the Phillips Petroleum Co., Bartlesville, Okla., at its No. 2 gasoline plant in Webb City, was damaged by fire.

Texas

CLARKSVILLE, TEX.—Clarksville Cotton Oil Co., D. J. Grave manager, is planning rebuilding the gin damaged by fire recently.

HOUSTON, TEX.—Commercial Iron Works, C. R. Cotton, Second National Bank building, has acquired a site at Mack and Esperson streets, and will erect a plant.

HOUSTON, TEX.—Baker Oil Tools Inc., R. C. Baker president, Huntington Park, Calif., with offices and branch at 2301 Commerce street, Houston, has acquired a 5-acre site, and will erect initial unit of a plant for the manufacture of oil field equipment. Later it plans to add 4 units, each 65 x 100 feet, until the plant, 65 x 500 feet, has been completed. Plans and specifications made by William A. Burnet construction engineer, Shell building, Houston.

KERRVILLE, TEX. — Warehouse of the Schreiner Wool Co. suffered losses amounting to $31,000 recently.

PORT ISABEL, TEX.—City, has voted $50,000 for waterworks bonds.

WICHITA FALLS, TEX.—Ray Sheet Metal Works Inc. has been organized by John F. Ray and Carroll L. Anderson.

WICHITA FALLS, TEX. — Superior Pipe & Fittings Co. has been incorporated by E. E. Van Wormer and William Duncan.

Wisconsin

KAUKAUNA, WIS.—Thilmany Pulp & Paper Co. plans construction of a $50,000 heater room and bleach plant.

LA CROSSE, WIS.—Trane Co., manufacturer of heating, ventilating and air conditioning equipment, has awarded a contract to T. J. Molzahn & Sons Inc. for construction of a 1-story fireproof plant addition, 120 x 163 feet, to be ready April 15. Cost with equipment is estimated at $75,000. Reuben N. Trane is president.

MILWAUKEE—City, R. E. Stoelting city commissioner, plans to purchase $50,000 worth of snow removal equipment.

MILWAUKEE—C. H. & E. Mfg. Co., 3849 North Palmer street, will equip a recently erected plant with new machinery and equipment. The company manufactures road rolling and other equipment.

SUPERIOR, WIS.—Union Sash & Door Co., Oakes avenue, Carl Ahlborg president, plans immediate construction of a new factory to replace the one recently destroyed by fire.

WAUPACA, WIS. — Waupaca county highway commission will close bids March 3 for 1 and 2-story addition, 80 x 100 feet, for a garage and workshop estimated to cost $45,000, with equipment.

Minnesota

HIBBING, MINN.—Village water, power and building commission, J. P. Murphy secretary, plans a generating project at the muncipal heat and generating plant. Bids are asked for finishing and installation of boiler and auxilary equipment. Burlingame & Hitchcock, 521 Sexton building, Minneapolis, are the engineers.

MINNEAPOLIS—University of Minnesota, Dr. Lorenz Straub university engineer, has designed and will supervise construction of a hydraulic laboratory on Hennepin Island in the Mississippi river, to cost $100,000. The main laboratory will be 50 x 300 feet and an adjoining building, 50 x 90 feet, will serve as a machine experiment station.

MINNEAPOLIS — Northern States Power Co., Robert F. Pack president, will spend $3,365,000 during 1936 on new construction and improvements. The program includes new substations in Minneapolis and St. Paul, improvements in steam plant at Fargo, N. Dak., enlarging of substation at Essig, Minn., rebuilding of several transmission lines, and various other improvements.

Nebraska

OMAHA, NEBR.—Industrial Mfg. Co. has been incorporated by Charles Vitek, Bernhard Stalmer and Joseph Opocensky, to manufacture tools and machinery.

Colorado

DENVER — Southern Contracting Co., A. E. Perry treasurer, Box 262, Denver, is asking for sand digging machinery.

Montana

MISSOULA, MONT.—Ideal Hose Coupling Co. has been incorporated to manufacture hose couplings, tools, and machinery by H. J. Sturgis, C. S. Hansen and D. C. Curtis.

Pacific Coast

LOS ANGELES—California Hardware Co., John C. Austin and Frederic M. Ashley, architects, will build a reinforced concrete warehouse, five stories high, at 107 South Rise street, at a cost of $85,000.

LOS ANGELES—Scovill Mfg. Co., Waterbury, Conn., manufacturers of brass mill products, has leased 8000 square feet of space at 2627 Santa Fe avenue for general offices and warehouse, vacating its old quarters at East Fifteenth street.

LOS ANGELES — Hemphill Diesel Engineering school, 2121 San Fernando road, plans an expenditure of $40,000 in new equipment and an addition to the plant. Norstrom & Anderson, 649 South Olive street, are drawing the plans.

Canada

SHERBROOKE, QUE.—Municipality, T. Trembley city manager, has under consideration a $500,000 power plant.

WHERE-TO-BUY

BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Construction Co., 1438 Koppers Bldg., Pittsburgh.
Youngstown Sheet & Tube Co., Youngstown, O.

BILLETS (Alloy and Carbon Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Firth-Sterling Steel Co., McKeesport, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Steel & Tube Co., Canton, O.
Washburn Wire Co., Phillipsdale, R. I.

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Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Heppenstall Co., 47th & Hatfield Sts., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Standard Steel Works Co., Burnham, Pa.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Steel & Tube Co., Canton, O.

BILLETS AND BLOOMS (*Also Stainless)
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
*Ludlum Steel Co., Watervliet, N. Y.
*Republic Steel Corp., Dept. ST, Cleveland, O.
Standard Steel Works Co., Burnham, Pa.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Steel & Tube Co., Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

BINS (Storage)
Petroleum Iron Works Co., Sharon, Pa.

BLAST FURNACE FITTINGS
Pollock, The Wm. B., Co., Youngstown, O.

BLAST FURNACE SPECIALTIES
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa.
Brosius, Edgar E., Inc., Sharpsburg, Pa.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.
Pollock, The Wm. B., Co., Youngstown, O.
Shoop Bronze Co., The, 344-360 W. Sixth St., Tarentum, Pa.
Steel Industries Engineering Corp., Empire Bldg., Pittsburgh, Pa.

BLAST FURNACES—See FURNACES (Blast)

BLOCKS (Chain)
Ford Chain & Block Co., York, Pa.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

BLOWERS
Coppus Engineering Co., 359 Park Ave., Worcester, Mass.
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., Phillipsburg, N. J.
Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland, O.

BLUE PRINTING EQUIPMENT AND SUPPLIES
Bruning, Chas., Co., Inc., 445 Plymouth Ave., Chicago, Ill.

BOILER HEADS
Bethlehem Steel Co., Bethlehem, Pa.

BOILER TUBES—See TUBES (Boiler)

BOILERS
Murray Iron Works Co., Burlington, Iowa.
Oil Well Supply Co., Dallas, Texas

BOLT AND NUT MACHINERY
Landis Machine Co., Waynesboro, Pa.

BOLTS (*Also Stainless)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., Los Angeles, Cal.
Jones & Laughlin Steel Co., Jones & Laughlin Bldg., Pittsburgh, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh, Pa.
*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

BORING MACHINES (Horizontal)
Landis Tool Co., Waynesboro, Pa.

BOSH PLATES (Copper)
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.

BOXES (Annealing)
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Petroleum Iron Works Co., Sharon, Pa.
Pollock, The Wm. B., Co., Youngstown, O.
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh, Pa.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BOXES (Case Hardening)
Driver-Harris Co., Harrison, N. J.
Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland, O.

BOXES (Open Hearth Charging)
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Morgan Engineering Co., The, Alliance, O.
Petroleum Iron Works Co., Sharon, Pa.
Pollock, The Wm B., Co., Youngstown, O.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BRAKES (Electric)
Clark, The, Controller Co., 1146 E. 152nd St., Cleveland, O.

BRAKES (Press)
Cincinnati Shaper Co., Elam and Garrard Sts., Cincinnati, O.

BRICK—(Insulating)—See INSULATING BRICK

BRICK (Refractory)—See REFRACTORIES, CEMENT, etc.

BRICK (Silicon Carbide)
Carborundum Co., The, Perth Amboy, N. J.
Norton Co., Worcester, Mass.

BRIDGE CRANES (Ore and Coal Handling) See CRANES (Bridge)

BRIDGES, BUILDINGS, VIADUCTS, STACKS
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Belmont Iron Works, 22nd and Washington Ave., Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., Los Angeles, Cal.
Ohio Structural Steel Co., The, Newton Falls, O.
Petroleum Iron Works Co., Sharon, Pa.
Truscon Steel Co., Youngstown, O.

BUCKETS (Clam Shell, Dragline, Grab, Single Line)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 W. Pershing Rd. Chicago, Ill.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BUCKETS (Elevator)
Link-Belt Co., 307 No. Michigan Ave., Chicago, Ill.

BUILDINGS (Steel)—See BRIDGES, ETC.

BURNERS (Acetylene)—See TORCHES AND BURNERS

BURNERS (Automatic)
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md
Surface Combustion Co., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BURNERS (Fuel, Oil, Gas, Combination)
Best, W. N., Engineering Co., 75 West St., New York City.
Surface Combustion Co., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BUSHINGS (Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.
Shenango-Penn Mold Co., Dover, O.
Shoop Bronze Co., 344-60 W. 6th Ave., Tarentum, Pa.

BUSHINGS (Oilless)
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.

BUSINESS CARDS (Engraved)
Modern Card Co., 1153 Fullerton Ave., Chicago, Ill.

BY-PRODUCT PLANTS
Koppers Construction Co., 1438 Koppers Bldg., Pittsburgh, Pa.

CABLE GRIPS
Smith Devices 2245 No. 12th St., Philadelphia, Pa.

CADMIUM
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

CADMIUM PLATING PROCESS
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

CAR DUMPERS
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CAR PULLERS and SPOTTERS
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CARBIDE
Linde Air Products Co., 30 E. 42nd St., New York City.

CARBURIZERS
Houghton, E. F., & Co., 240 W. Somerset Ave., Philadelphia, Pa.

CARS (Charging)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Morgan Engineering Co., The, Alliance, O.
Pollock, The Wm. B., Co., Youngstown, O.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CARS (Industrial and Mining)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Petroleum Iron Works Co., Sharon, Pa.
Pollock, The Wm. B., Co., Youngstown, O.

CARS (Scale)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.

CASTINGS (Acid Resisting)
Cadman, A. W., Mfg. Co., 2815 Smallman St., Pittsburgh, Pa.
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 344 Vulcan St., Buffalo, N. Y.
International Nickel Co., Inc., 67 Wall St., New York City.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Shenango-Penn Mold Co., Dover, O.
Shoop Bronze Co., The, 344-360 W. Sixth St., Tarentum, Pa.
Wellman Bronze & Aluminum Co., 6017 Superior Ave., Cleveland, O.

CASTINGS (Alloy Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Forging & Casting Corp., The, Ferndale, Mich.
Industrial Steel Casting Co., 2237 Water Works Drive, Toledo, O.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Reliance Steel Casting Co., 2818 Smallman St., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

CASTINGS (Brass, Bronze, Copper, Aluminum)
Aluminum Industries, Inc., 2348 Beekman St., Cincinnati, O.
Bethlehem Steel Co., Bethlehem, Pa.
Cadman, A. W., Mfg. Co., 2815 Smallman St., Pittsburgh, Pa.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.